IRON AGE

editorial

The Forgotten Man

IN a few years the steel industry will complete a 15 million ton expansion program. Ore boats are being built. Taconite plans are being rushed. Ore will be coming from Canada and Venezuela in great quantities in 3 to 4 years.

More coal and coke are in the cards for the new capacity. Freight cars are being built to take care of needed transportation. Men are being trained for new jobs. Machinery has been ordered, motors are being built and government priorities may soon give a green light to steel mill construction.

Everything looks jim dandy. All this augurs well for the country and for steel management. Defense needs will be met. Steel people will be in a position to make steel for war or defense and for essential civilian economy.

But next week there will be an annual convention at the Commodore Hotel in New York of some of the most individualistic people in the country. They are the ones on whose shoulders rests the responsibility for failure or success of the gigantic steel expansion program.

They are the scrap dealers and brokers who must each year gather at least 25 pct of the metallics that go into steelmaking. Someway, somehow they got together close to 25 million tons of market scrap from the factories, farms, byways and highways of the country in 1950.

This year their job will be harder. But their real job to come is a corker. They alone know what kind of a nightmare it will be. They must someway find an additional 3,500,000 tons of scrap a year when the current expansion in steel is completed.

They have no big units and properties to supply their product. They have to deal with thousands of sources and people all over the country to get what the mills need. They must cajole, curse, plead, beg, argue, bargain and turn somersaults to get a big part of the market scrap needed.

They know that if cream is ordered at skim milk prices you won't get cream. They know they will soon have ceilings, rules and red tape forced on them by people many of whom never had to get scrap from thousands of different sources.

They will be blamed when they don't get the scrap. They will be cussed out when the quality is not up to laboratory standards. Fortunately they can take this in their stride.

They produced the scrap before. They will do it again. They will need a lot of help with a minimum of red tape. They are the forgotten people in the defense program. They are free enterprise in its more robust form.

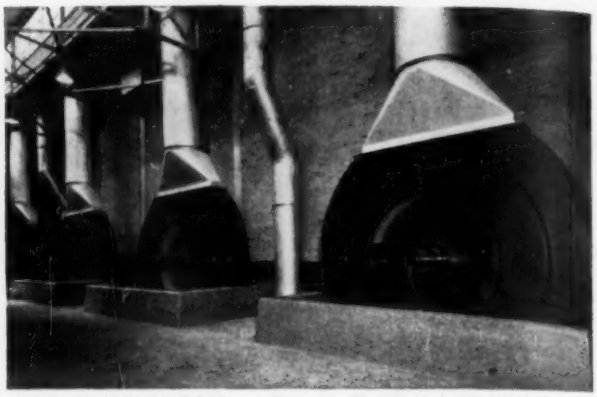
Tom Campbell

editor

G-E SYNCHRONOUS

SAVE MONEY

SAVE ON OPERATING COSTS . . . Municipal plant gets higher efficiency by continuous operation at constant speed of three 500 horsepower, 1.0 power factor, G-E synchronous motors, each coupled to a centrifugal storm-sewer pump.



SAVE ON INITIAL COST . . . Paper mill selected this 4000 hp, 200 rpm, G-E synchronous motor for driving the montague grinders at low speed. Maximum operating efficiency thus resulted.

IRON AGE *newsfront*

news methods and product forecast

► Electroplated plastic reflectors are being replaced in some cases by steel stampings on which aluminum is deposited by a vacuum process. Thickness of the aluminum coat is about ½ to 1 micron. (One micron equals 0.00003937 in.)

► As the arms program gets up steam the alloy requirements per ton of steel will climb above their normal rate. During World War II alloy scrap did not come back to the mills in sizeable quantities until some 7 months after the peak demand for alloy steel occurred. The result was an intensified demand for virgin alloying elements in the early stages of the armament program.

► Pilotless jet airplanes are now being tested in Australia for use as antiaircraft missiles. Present test equipment carries a pilot to develop the radio control equipment. A simplified version of the Armstrong-Siddeley-Viper engine is being used. This is the turbo jet version of the Mamba, for which Curtiss-Wright has the American rights.

► Despite the 20 pct cutback in tin consumption ordered by NPA, U. S. tinplate producers will try to hold output near current high levels by persuading customers to use the lighter (electrolytic) coatings. They'll point out that it's either that or a bad dislocation in supply. In favor of speeding the change is the current strong trend in favor of electrolytic over hot-dipped tinplate.

► A non-magnetic aluminum bronze alloy has been developed for the Navy's Bureau of Ships. The iron content of the former alloys has been replaced with a non-magnetic element.

► Steel people would not be at all surprised to see the size of National Steel Corp.'s Eastern mill turn out to be at least 50 pct larger than most current guessing. In other words, it will probably have a capacity of at least 1,500,000 ingot tons a year.

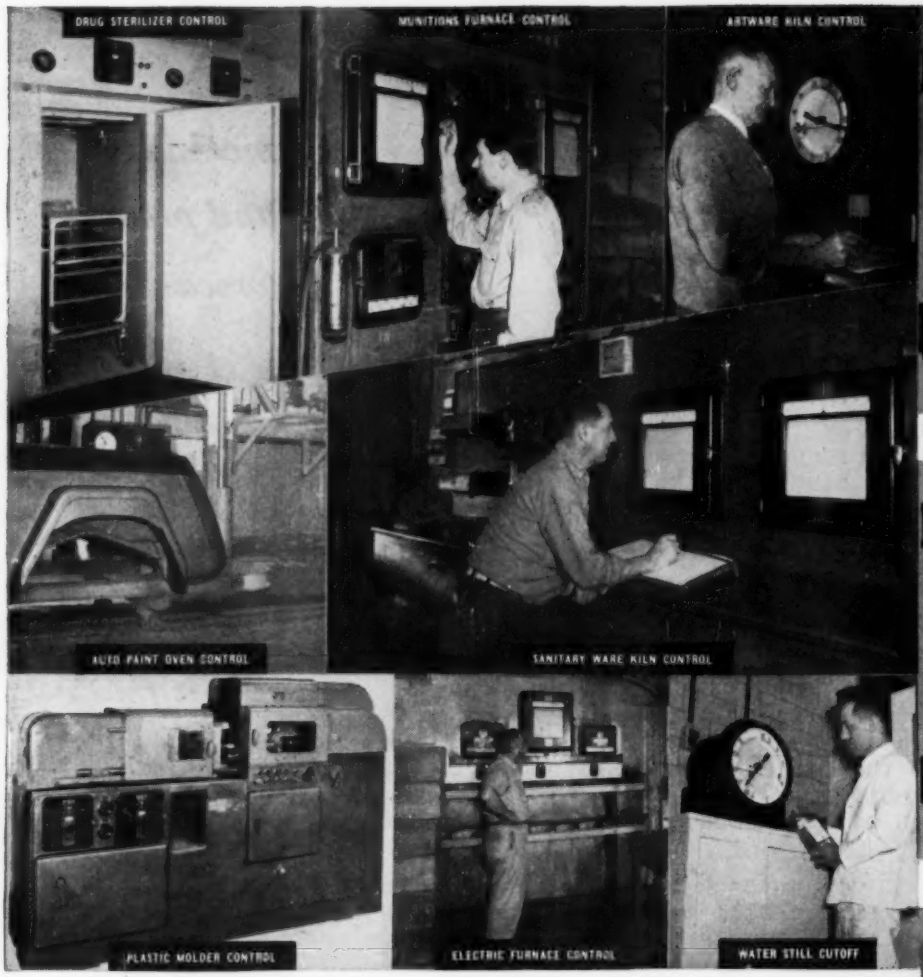
► Loans for defense plants tentatively approved under Stuart Symington's NSRB will be given a careful review before getting an official OK from William H. Harrison's DPA.

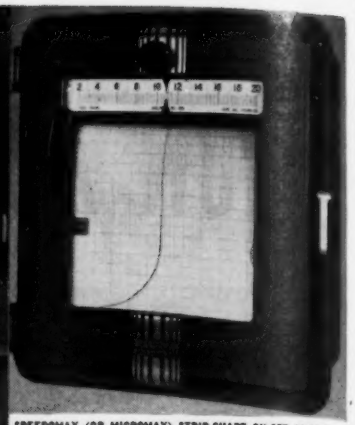
► This year the chances are better than they have been in years of coal labor negotiations coming to a successful conclusion without the usual crippling strike. It is not so much the size of present coal stocks as the change in character expected in the negotiations.

► The first binary phase diagrams for titanium sponsored by the Air Force have been completed. Among the compositions being studied are combinations of titanium with nickel, aluminum, carbon, oxygen, nitrogen and chromium. The whole project should be completed by Spring.

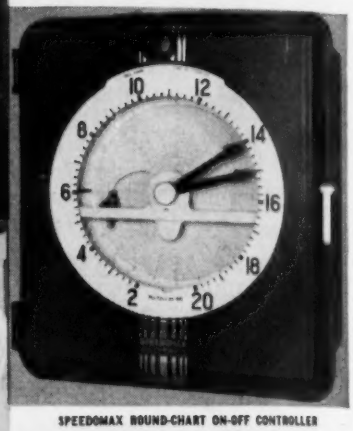
► The Naval Research Laboratory facilitates electron microscopy of metal samples by a technique of observing the same areas on a thin transparent film impression of a steel specimen in both the light and the electron microscope. Areas found with the light microscope can be then observed with the higher magnification of the electron microscope.

► An automotive main transmission shaft is being produced on automatic screw machines with round carbide insert tools. Seven pounds of metal are removed in 80 seconds.

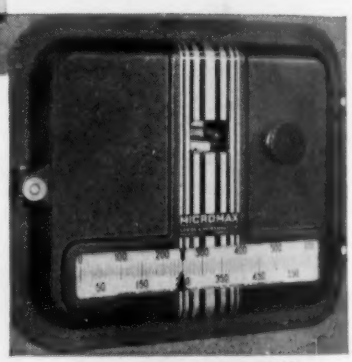




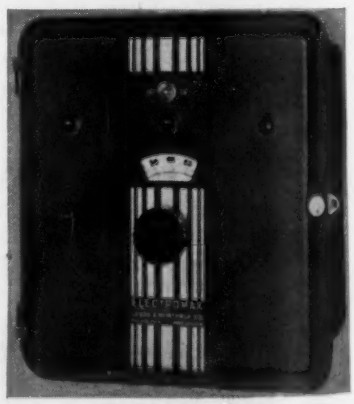
SPEEDOMAX (OR MICROMAX) STRIP-CHART ON-OFF CONTROLLER



SPEEDOMAX ROUND-CHART ON-OFF CONTROLLER



MICROMAX MODEL C ON-OFF CONTROLLER



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Dependable "ON-OFF" Controllers for Industry

THE kind of control instrument which industry calls on-off or 2-position is not only the oldest form of automatic regulator, but is one which many manufacturers still use, instead of more advanced types, for simple requirements. Usually, the instrument merely closes the valve when temperature reaches the control point, and opens valve again when temperature falls below point. The question of whether such on-off action is best for the given case can of course be settled by using the instrument with the best, most useful features. Here are some which L&N On-Off Controllers offer:

1. Instruments may be Recording Controllers with either strip-chart or round-chart, or Controllers with no charts at all.
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THESE instruments are fully automatic; need no standardizing; are ideal even for hard-to-get-at or difficult locations.

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IRON AGE *summary*

iron and steel industry trends

Military Slow to Decide on Needs
Money Ready But Procurement Lags
Most Steel People to Welcome CMP

THE real snag in the defense program is the slowness of the military to decide what it needs. Money which has been appropriated for defense is being spent at a snail's pace. It is now clear that much of it will not be converted into defense material during the present fiscal year—or soon after.

It is true that military orders are beginning to flow, but the contracts placed so far are puny compared with total defense needs, for which funds are available. If defense procurement is to be boosted sharply, the people in charge of defense planning will have to agree quickly on what is needed and how much.

The present system of DO orders will not assure an orderly flow of materials when military procurement reaches its peak. Before that happens—probably during the second quarter—a controlled materials plan will be in effect.

To Most—CMP is Welcome

Most steel producers will welcome a full CMP program for steel. For some it can't come soon enough. People administering the present DO system agree with them. Manpower to operate this and other programs is still Washington's big problem, but things are beginning to move on that score. In some instances defense officials are no longer directly contacting the men they want in Washington. Instead they are going to presidents of companies and saying in effect, "We need these men, you see that we get them."

Meanwhile, the steel market is becoming more confused. Some holders of DO orders are overstating the urgency of their needs, asking delivery of steel earlier than it is actually needed. Others are trying to protect their regular quotas by tapping new suppliers for their DO orders.

But some consumers with urgent needs covered by DO orders are not able to get steel when they need it. There are many such frustrated consumers running around the country wildly waving DO orders.

Bookings of defense orders are becoming more extended each day. DO orders for cold-rolled sheets are filled to April or May; hot-rolled sheets, June; plates, March; pipe, March or April. This is the average extent of DO bookings; it is not uniform among all producers.

Issue Steel Quotas for March

Some steel firms have done a good job of cleaning up order backlogs, and are now issuing quotas to regular customers for March on products such as bars, shapes and plates. Ordinarily these quotas would have been issued in January or February. The new quotas are slashed 40 to 50 pct from October allotments.

Those who thought that auto cutbacks would make steel easier are now beginning to find out how wrong they were. The same old fakers are still trying to peddle steel at 14 to 16 cents a pound (about 3 times regular mill price)—and they are finding takers when they can deliver.

Expensive multiple-pass conversion arrangements are continuing. For example, one deal calls for slabs from a Pennsylvania mill to be reduced in the East and Midwest and passed along finally to another mill in another city for finishing. Final cost of this steel is about $300 a ton, with freight charges, rolling fees, etc.

Claim Freight Car Building Mishandled

The freight car building program is not gathering steam as fast as had been expected. Some people in the industry claim the program is being mishandled, that materials are not flowing smoothly into car building plants. Some of them are clamoring for a redistribution of March steel allotments under the program. It is unlikely that production will reach the 10,000-car-per-month goal until June.

Steelmaking operations this week are scheduled at 102.5 pct of rated capacity, up 1½ points from last week.

(nonferrous summary, p 96)

Dear EDITOR

Letters From Readers

On The Right Track

Sir:

I have just read your editorial, "Hallelujah! We Are Started," in the Dec. 28, 1950, issue. I am in accord with your praise of Mr. Wilson. Certainly the President is to be commended for his choice in this instance. Mr. Wilson warrants much more confidence than the usual set of political hacks appointed by this administration.

However, I could not help wondering just what you felt we were getting started on and where you thought we were going. Do you mean we are once again starting on the road to more Yaltas, Teherans and Potsdams? Are we once more to start on the road to world war, bleating the praises of Democracy and winding up with more people enslaved than before we started?

The shallowness of thinking in the past of our leaders can no better be shown than by recalling the criticism of "Balance of Power" politics in Europe. This was depicted as the ultimate in shameful policy. We have now awakened to find that we destroyed this balance of power all right, but hadn't the vision to see that in doing so we created a vacuum made to order for our then "ally" and our now very real enemy. We are now, just five years later, frantically trying to create a "Balance of Power" to meet this enemy. A complete reversal is a mild way of stating it.

How stupid can we really get? Is more of this what you are shouting "Hallelujah!" about?

L. L. JONES
Industrial Metal Products Co.
Ravenna, Ohio

Of course we are 5 years too late for a lot of things. Of course we are late because we have had no leadership—we have none yet with the possible exception of Mr. Wilson. We are at least getting started because we have a man in Wilson who knows what we are up against and what should be done.—Ed.

Aids Instructor

Sir:

I wish to express my appreciation for the charts, "Comparative Tool Steel Brands," sent to us. The chart will aid greatly in gathering generally used tool steels into groups so that the apprentice can see the choices available in each classification. Also, he can locate the types of steels that he uses in his work and compare its use with its proper classification. The chart will aid me as the instructor in having a ready-formed chart listing many of the common examples of tool steels, each under its proper classification.

C. A. CHRISTIAN
Metallurgy Instructor
School of Vocational & Adult Education
West Allis, Wis.

Long Fuel Hose, Maybe?

Sir:

Your "On The Assembly Line" column in the Dec. 7, 1950, issue headed "Natural Gas Engines" has come to our attention. We do appreciate your giving our story on these "Dual-fuel" engines this valuable attention, but the substitution of the the word "Trucks" for "units" in your magazine's write-up has caused some reverberations in this vicinity.

Dual-fuel units of the type described were designed for stationary or portable use on oil field drilling rigs, irrigation pumps, sawmills, etc., wherever natural gas is readily available. Of course, no means has been devised to carry natural gas as a fuel for any self-propelled vehicle.

Although the trucking field is only one of hundreds of applications of our engine, it seems the association of the word "Diesel" with trucks is almost automatic. Perhaps this is the reason the word "trucks" sneaked into your story. We have not found, and it is doubtful whether anyone ever will find a way to pipe natural gas as a fuel to trucks.

J. W. BROWN
Advertising Mgr.
Detroit Diesel Engine Div.,
General Motors Corp.

Praising Patton

Sir:

Just to let you know—your column, "On the Assembly Line," says more in a few lines than most of the so-called trade papers say in 10 pages. I never miss your swell "early" news. I congratulate you!

W. ALLEN
Bronx, New York

Maintains Story File

Sir:

Would it be possible for me to obtain two copies of the article, "Annealed Ductile Iron for Better Machinability," by J. F. Kales and R. Goldhoff, published in the Dec. 14, 1950 IRON AGE on p. 105?

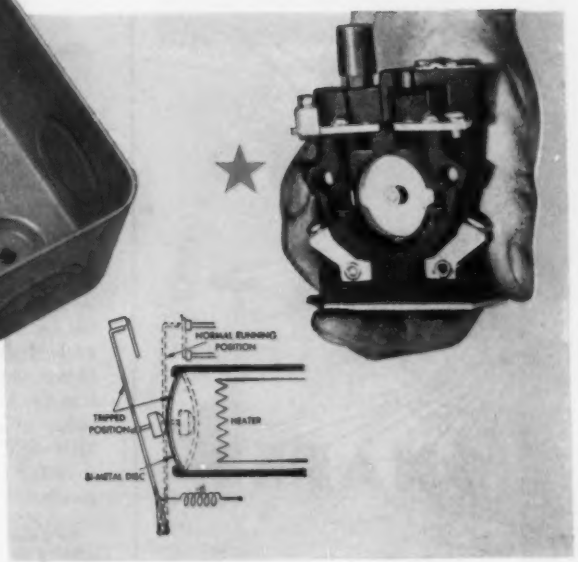
These two copies will be for Prof. Boston and myself. I have recently been asked to act as secretary of the Metal Cutting Data Committee of the ASME and it is my responsibility to collect articles dealing with metal cutting. This article by Kales and Goldhoff is of excellent caliber and I am very glad to see THE IRON AGE publishing material of this nature.

W. W. GILBERT
Associate Professor
University of Michigan
Ann Arbor, Mich.

YOU CAN BE **SURE**.. IF IT'S

Westinghouse

CUT MOTOR BURNOUTS



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. . . positive protection against overloads

Stop worrying about the inconsistencies of ordinary overload relays.

Investigate the new Westinghouse Life-Linestarter with the bi-metal DISC overload relay which provides a positive contact pressure, with snap action. It retains its precise calibration regardless of the number of operations. It's the only relay that may be set for "automatic", "hand" or "no-stop" operation.

Positive protection is but one of the advanced features offered by the new Life-Linestarter. It's best because of its uniformity and completeness of line (NEMA sizes 0 through 4, to 100 hp, 600 volts), superior performance, ease of installation and other cost-saving advantages.

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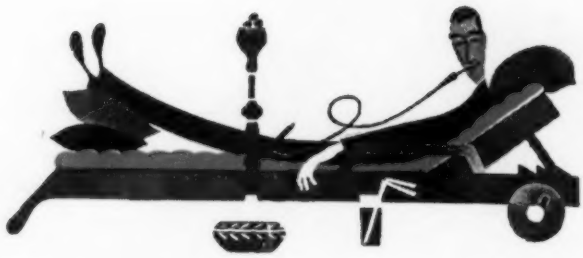
TOMORROW'S STARTER—**TODAY!**



fatigue cracks

by Charles T. Post

stimulating

Not since the days when we pored over the late Don Marquis' *Archy and Mehetabel* have we experienced the same thrill as when we opened the fan mail on your favorite family journal's new format. Archy, you will recall, was a cockroach who jumped on the typewriter keys in order to write letters to Mehetabel, the cat. Since he couldn't jump on the letter key and shift key at the same time, there were no capitals. Republic Steel's Allan T. Frary created the same effect with his commentary, although we certainly don't mean to infer that Mr. Frary is a cockroach. Wrote Mr. Frary:

> the adaptability of the iron age in refusing to follow slavishly such outmoded practices as capitalization and punctuation is most refreshing you are following such fearless leaders as helena rubenstein and surely modernity is to be admired above all things i think a logical next step would be a telegraphic style of wording the articles to match the telegraphic uncapitalization and unpunctuation in the headings see what you can do yours very truly allan t frary

After that, we picked up a crackling missive from R. J. Weber, assistant director of purchases, Great Lakes Steel, who started out, "I was a little late this week in reading my IRON AGE, for which I am now thankful." It developed that your f.f.j.'s Detroit editor, Walt Patton, had been needling Mr. Weber over the effervescent Detroit scrap market. "But now," Mr. Weber complained, "to further aggravate my ulcers, Walt had a picture taken with a halo around him and plastered it directly above his article *On the Assembly Line* . . . Mr. Post, how long should we remain friends?"

Then there was the scribbled blast written in violet ink " . . . smart alec. sophomoric . . . oh, for a little depth and dignity . . ."

The editors, swaying like reeds, are backing down. They have given up the idea of cutting a hole in the cover, like the late lamented Flair, and are even going to start the by-lines with capital letters.

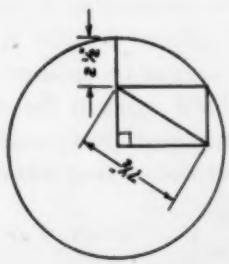
Puzzlers

By J. A. Crites

Your new puzzle editor bows his head in shame for supplying the wrong answer to the smoke stack problem. When Charlie asked us to work it out we didn't realize he was tossing us an outside curve. Expect to hear from MIT any day now requesting that we send back our degree.

Our thanks to C. E. Norton, George Benoit and Carl Blass, Talon Inc., for setting us straight with the correct answer of 3.07 feet. We can't vouch for the answer to the Dec. 28 problem, as our chauffeur is on vacation, but Eugene Greth, Birdsboro Steel Fdry. & Mach. Co., Mrs. Hill, Lakeland, Fla., and Bob Huff, Canton, Ohio, claim that the man walked for 45 minutes.

We've had a week's rest from puzzles and our heads are clear once again, so let's start the New Year with a real toughie provided by the puzzle(d) brain of the editorial department, Bob Hatschek. The drawing shows a rectangle with one corner at the center and another on the circumference of a circle. Using the dimensions given, what is the diameter of the circle?



machine tool high spots

sales inquiries and production

by W. A. Lloyd

Bottleneck or Wonder?—Whether the machine tool industry will be branded a bottleneck by July 1, or generally regarded as a spectacular example of defense planning, will largely depend on a decision which will probably be made within the next 10 days in Washington.

Machine tool builders, at the request of NPA's machinery division, have submitted photostated copies of their order boards by January 8 for review. Rumor has it that this is the first step in the activation of the tentative production schedules (phantom orders) which carry a priority, and thus is the answer to the machine tool industry raw materials and components problem.

A Cautionary Note—While industry warns against undue optimism for immediate action, that it may be a long process complicated by secondary decision as to what agency will handle the project, money, and other factors, it appears that the industry's case is due for a realistic appraisal.

At the moment, the industry's backlog is 12.2 months at the present rate of shipments. The bulk of the defense business is still to be placed, according to industry sources, including some projects under consideration that are beyond anything yet seen. Potential volume of defense business is estimated at $1.5-billion.

Prepare for Avalanche—New order volume is $90-million a month, or more than $1-billion a year. Mutual Defense Assistance Program orders are coming in, and many companies have 30 pct rated business. Defense orders have increased materially during the past 30 days. The industry is swamped.

Some in the industry are moving swiftly to meet this avalanche. Under wraps are plans for several large plant expansions, at least two of which will be additions to present buildings. At least one of these projects will be announced next month.

More Sub-Contracting—Another expedient considered is sub-contracting capacity. It is likely that the industry will do much more sub-contracting than in World War II. One company is lining up five or six customer shops which have no defense business for subcontract work. Another will subcontract production of one complete line.

This will help solve the industry's manpower situation as well. In some areas, shops without defense business or even the promise have been reluctant to let their men go.

Finished by 1953?—In view of such preparations, the industry's tooling for defense would pyramid in 1951-1952 and by 1953 be pretty well completed. Then the civilian market might once again be a consideration.

A year ago, the industry was hungry for orders. Today, backlogs are higher in relation to current shipments than at any time in the industry's history. If the industry is given a priority as a result of the examination of the order boards, production will accelerate and 1950 shipments may be doubled, an achievement in any non-mass production industry.

November Shipments High—Some of the government's projects under construction or being tooled up are a clue to the urgency of this phase of national defense. On one project, if the machine tools are not received by May, the order is canceled.

In Cleveland, National Machine Tool Builders' Assn. reported that shipments of machine tools in November were the highest since August, 1945. NMTBA's preliminary index of November shipments was 110.9 compared with 100.9 in October and 67.6 in November, 1949. The November new order index was 292.7 compared with 289.6 in October and 84.3 in November, 1949.

FREE *publications*

These publications describe money-saving equipment and services . . . they are free with no obligation . . . fill in and mail postcard.

New Stainless Bulletin

The analysis, corrosion resistance and working characteristics of Carpenter Stainless No. 20 steel are detailed in a new 20-p. bulletin. The booklet points out that one of the outstanding features of the material is its good corrosion resistance to hot sulphuric acid, which permits its use in 60° Be (78 pct) sulphuric acid solutions at temperatures of about 125°F. General corrosion resistance of the steel against more than 140 acids and corrodents is reported in a table. The booklet includes tables of physical constants and nominal mechanical properties. Heat treatment, workability, and recommended speeds for machining are also given. *Carpenter Steel Co.*

For free copy insert No. 1 on postcard.

Testing Machines

Features of the Universal medium capacity unit-type table model testing machine are presented in a new 4-p. brochure detailing characteristics of the unit for tension, compression, flexure, shear and transverse tests. Designed for volume production testing or laboratory research work, the machine is available in two capacities having three load scale ranges, as shown in the folder. *Testing Machine Div., National Forge & Ordnance Co.*

For free copy insert No. 2 on postcard.

Machine Tool Attachments

The Master portable motorized lathe converter, a metalworking machine with interchangeable heads or spindles to accomplish all types of machine shop operations, is described in a new 20-p. catalog telling how the unit will, in many cases, pay for itself in a short time. The latest models of the converter are shown, along with information on the various attachments and accessories for performing milling, boring, drilling, grinding and slotting operations in addition to the jobs normally performed on the lathe or turret. *Master Mfg. Co.*

For free copy insert No. 3 on postcard.

Car Shaker

Allis-Chalmers car shaker for unloading granular material from hopper-bottom gondola cars is described in a new 6-p. bulletin. Construction features of the shaker are given, along with specifications and a cross-section through the vibrating mechanism. The shaker, designed to save time and money and to eliminate danger to operating personnel, has application in power houses, steel mills, sand and gravel, chemical, coke and glass plants, coal mines and docks, sugar beet and paper mills, foundries, and building block and slag product manufacturing plants. *Allis-Chalmers Mfg. Co.*

For free copy insert No. 4 on postcard.

Aluminum Protection

The Pylumin process, providing a simple, inexpensive and rapid method of producing satisfactory paint base coatings on aluminum and aluminum alloys, is described in a new 10-p. booklet. This corrosion proof base for paint finishes acts quickly on aluminum, converting the surface into a nonmetallic film of complex basic oxides, forming a highly resistant coating and serving as a base for the finishes. Processing and instructions for operating are included. *Pyrene Mfg. Co.*

For free copy insert No. 5 on postcard.

Defense Welding Manual

The illustrated "Manual of Welding Engineering and Design" is the first in a series of free technical handbooks on the latest developments in welding materials and techniques. Details on the newest advances in Eutectic Low Temperature welding alloys with special reference to applications for defense production and maintenance are presented. In addition to technical data on characteristics, properties and applications and operational procedures for these alloys and fluxes, the manual contains handy information on the art of welding in all its phases. *Eutectic Welding Alloys Corp.*

For free copy insert No. 6 on postcard.

Chilling Equipment

Facts and information about Cascade Sub-Zero low temperature industrial chilling equipment are presented in a new 15-p. brochure listing specifications on various models for freezing to —120°F. Uses and general applications for the equipment are described, along with data on the procedure for treatment of steel by chilling. Technical data and tables for use with the equipment are also included. *Sub-Zero Products Div., Deepfreeze Distributing Corp.*

For free copy insert No. 7 on postcard.

Alloy Selection Guide

Two new cobalt-base alloys are described in a completely revised 96-p. edition of the booklet, "Haynes Alloys for High-Temperature Service." The new booklet contains technical data on 10 alloys that were specially developed for service at elevated operating temperatures. A section on each alloy gives a general description of the

Turn to Page 92

NEW *production ideas*

new and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard.

Quick-Release Pins

Used like a bolt; need no retaining cotter keys or nuts.

Used for shackle purposes or as tie-down fasteners, a Pip pin is a quick-release pin used like a bolt except that no separate retaining items such as cotter keys or nuts are needed. The pin is inserted into holes in the parts to be held. They cannot work loose, and must be deliberately removed to effect disassembly of any units they are holding. *Aviation Development, Inc.*

For more data insert No. 11 on postcard.

Wood Pattern Coating

Preserves patterns from dry rot, improves draws, lasts longer.

CK is a new type wood pattern coating for all types of foundry service. It is claimed to be so hard that it stands up exceptionally well under sand slingers and practically eliminates tiny holes in wood patterns resulting from the jabbing of vents in molds. It withstands heat up to 350° F, is impervious to moisture, and does not oxidize or weather. *Carboline Co.*

For more data insert No. 12 on postcard.

Cutting Oil Additive

Effective against development of rancidity and obnoxious odors.

A preservative for soluble-type cutting oils and coolants is a new odorless formulation that inhibits the growth of bacteria, stabilizes the emulsion and preserves the lubricating qualities of the oil for its full life. Normal use of coolants has been increased from 2 or 3 days to a period of 3 weeks when the additive has been used. The product is effective in a solution of 1 gal of additive to 1200 gal of prepared soluble cutting oil. *West Disinfecting Co.*

For more data insert No. 13 on postcard.

Barrel Filling Meter

Measures repeat quantities from 25 to 79 gal by 1-gal increments.

Production of a new 60 gpm 1½-in. pipe size barrel filling meter has been announced. Only a single gear change is necessary to obtain different quantity settings and changes may be made without use of tools. The meter is equipped with two counters: a totalizing counter registers the total meter through-put; a reset type counter indicates the number of containers filled. *Meter Div., A. O. Smith Corp.*

For more data insert No. 14 on postcard.

Radiation Detector

Permits direct radiation readings at a glance; weighs less than 1 lb.

Called a radiation monitor, a new atomic radiation detector is equipped with a self-contained power source, and has neither tubes nor batteries. It is the size of a quart oil can. Radiation measurements are read from the monitor simply by noting the position of a pointer as it moves across a graded scale. The speed at which the pointer moves across the scale is in proportion to the strength of radiation, and the distance it moves in a

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production ideas

Continued

given time indicates the amount of radiation to which the instrument has been exposed during that time. *General Electric Co.*

For more data insert No. 15 on postcard.

Steam-Jet Cleaner

For locations where ample high pressure steam is available.

A new steam-jet cleaning unit known as Speedyjet makes available to companies which have ample high pressure steam supply the advantages of the Speedylectric system of steam-jet cleaning. The machine includes a high pressure detergent tank mounted on a lightweight all-metal dolly with rubber tired 10-in. wheels and handle bar grips for easy portability; 25 ft of high pressure steam hose; and 25 ft each of steam and detergent hose from the tank to the Speedylectric steam lance. The unit is equipped with pressure gage, 200 psi safety valve, and necessary control valves. It is built under the ASME code and carries National Board Stamping & Insurance Company certificate. In the Speedylectric system of steam-jet cleaning, solvent, detergent or paint stripper can be applied either alone or mixed with steam in any desired proportion. *Livingstone Engineering Co.*

For more data insert No. 16 on postcard.

Garage Door Operator

Opens or closes doors at touch of a push button on car dashboard.

The device said to fit any Kinnear Rol-Top door, is operated by a simple electric-magnetic control. Pressing a control button mounted on the dashboard of the car energizes a magnetic actuating unit placed in the driveway. A small electric motor raises and lowers the door from inside the garage by cable and pulley. The device also automatically turns on garage lights as the door is opened, and turns them off again when the door is closed. The magnetic assembly for the driveway can be placed at any point over which the car passes in entering and leaving the garage. *Kinnear Mfg. Co.*

For more data insert No. 17 on postcard.

Descaling Compound

Removes most scale in 15 to 30 min.

A compound used for descaling or derusting iron or steel parts in tumbling barrels is said to often save from 1 to 4 hr in finishing a load of parts. It can be used either where parts are self-tumbled or with abrasive mediums; is safe to handle; and does not throw off fumes. D-Scale-RW is an inhibited acid type powder with wetting agent added. Hot water speeds up descaling action. *Magnus Chemical Co., Inc.*

For more data insert No. 18 on postcard.

Tilt Dial for Scales

Allows greater legibility in reading scale above eye level.

Tilting dial faces downward 25° is an optional feature in the Hydroscale line of hydraulic crane scales with capacities up to 10,000 lb. It allows greater legibility in reading the scale above eye level and is helpful when readings must be made at substantial heights frequently encountered. Tilting does not consume headroom or interfere with swivel of either eye or hook. *Hydroway Scales, Inc.*

For more data insert No. 19 on postcard.

Plastic Finish

Dulls the reflecting surfaces of stainless steel in guided missiles.

A new plastic synthetic finish, VB 248, developed to cut glare from guided missiles, provides an effective coating that adheres to highly polished stainless steel used in various aircraft devices. Because of its good adhesion quality, it can be applied to other uses where glare is not the primary objective. VB 248 takes a baking temperature of 275°F for 1 hr. *United Lacquer Mfg. Corp.*

For more data insert No. 20 on postcard.

Horizontal Filter

Suited for cleaning foundry sand; filter areas are 10 to 165 sq ft.

The Oliver horizontal rotary filter, on which all operations are visible, is suited for filtering operations involving the washing and dewatering of coarse solids contami-

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Big NON-ECCENTRIC *Precision Bearings ...that's what* KAYDON *stands for!*

Eccentricity in the bearing shown above was held within **.0002"*** ("practically unheard of" precision for bearings of this size).

Such accuracy doesn't just "happen". It's the result of **KAYDON**'s development of all the required facilities, within this one organization, for producing all the types and sizes of bearings listed below. These unique facilities are fortified by engineering know-how and broad experience in solving difficult bearing problems. **KAYDON** has its own modern atmospheric controlled heat treating, hardening with sub-zero conditioning, precision heat treating, metallurgical laboratory, microscopy and physical testing facilities.

Unbiased as to any one type of bearing design, **KAYDON** always is in position to recommend the one best suited to your specific use.

Counsel in confidence with **KAYDON**.

**Ground on Frauenthal Precision Grinder*

KAYDON Types of Standard or Special Bearings: Spherical Roller • Taper Roller • Ball Radial • Ball Thrust • Roller Radial • Roller Thrust

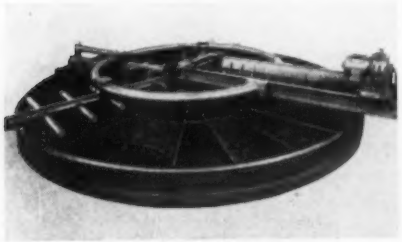
THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

• ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER •

production ideas

Continued

nated with fine waste material, organic or inorganic. Foundry sands which must be free of organic material are washed with great efficiency, it is stated. Capacity and



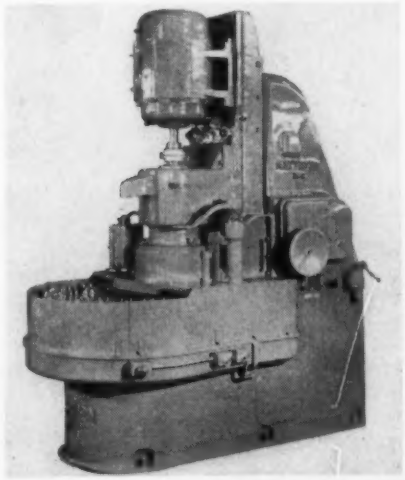
removal of water are high and the cake is discharged with moisture content ranging from 6 to 8 pct. Filters range from 4 to 15 ft diam, manufactured in steel, stainless steel and lead-protected. *Oliver United Filters, Inc.*

For more data insert No. 21 on postcard, p. 33.

Surface Grinder

Equipped with special fixture for grinding both ends of oil pump gear.

The No. 24-A rotary surface grinder with a special fixture for grinding both ends of oil pump gears has two sets of stations, one for grinding one side and the other for the opposite side. After one side is ground, the operator turns the piece over for grinding the opposite side. The pieces are then automatically ejected. Work is constantly checked by automatic sizer which keeps all pieces within specified tolerances without attention of the operators. The surface grinder is a small edition of the No. 36-A model with the same design and construction features, but produced



for use on smaller work pieces. Parts to be ground are placed directly on a rotary magnetic chuck, or work table carrying work holding fixtures. They enter at one side of the automatically controlled cylinder or segmental wheel, pass under it, and come out finished to size at the opposite side. *Mattison Machine Works.*

For more data insert No. 22 on postcard, p. 33.

Powershear

Full capacity continuous shearing within its entire speed range.

Design and rugged construction of the Di-Acro Vari-O-Speed powershear provide full capacity continuous shearing within the machine's entire speed range of 30 to 200 rpm. The cutting cycle can be quickly adjusted to the fastest speed at which the operator can feed the material for any given shearing operation, providing maximum operator productivity as the necessity of engaging the clutch for each cutting stroke has been eliminated. Speed

of shearing stroke for both continuous and single cycle operation is controlled with a handle located at the operator's left. A non-repeating positive safety clutch allows single stroke operation with the shear blade moving at any desired speed within the unit's range. *O'Neil-Irwin Mfg. Co.*

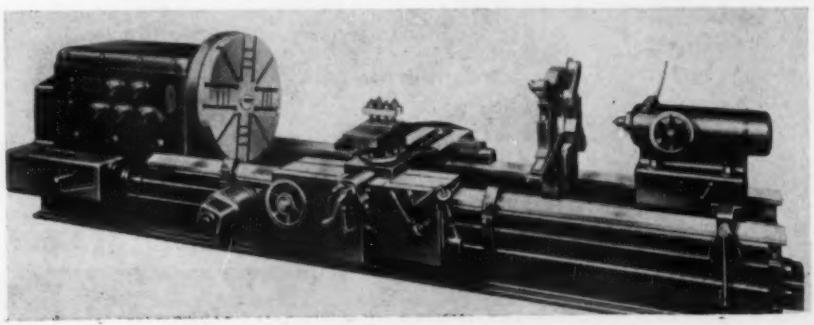
For more data insert No. 23 on postcard, p. 33.

Engine Lathes

56 feeds and threads available without changing quadrant gearing.

Ranging in size from 40 to 80 in., a new line of heavy-duty engine lathes have an extra margin of power, strength, and rigidity, with heavier beds and more extensive automatic lubrication. The lathes, powered by ac or dc motors, feature a total of 56 feeds and threads, produced by the quick change feed box without changing gears in the enclosed quadrant. Quadrant gears are maintained on the end of the bed to produce special feeds and threads. The 40-in. lathe is of high-grade semisteel and ribbed to resist strains and stresses developed during turning operations. The 6½-in. spindle mounted in the tailstock has a 12-in. travel. Lubrication is automatic. Drive for the 4-in. lathe is furnished by a 40 hp constant speed ac motor, or a 3:1 speed ratio dc motor. Controls on the carriage start and stop the main drive motor, set the directional rotation of the spindle and traversing the carriage. *Niles Tool Works Co. Div., Baldwin-Lima-Hamilton Corp.*

For more data insert No. 24 on postcard, p. 33.



Fire Extinguisher

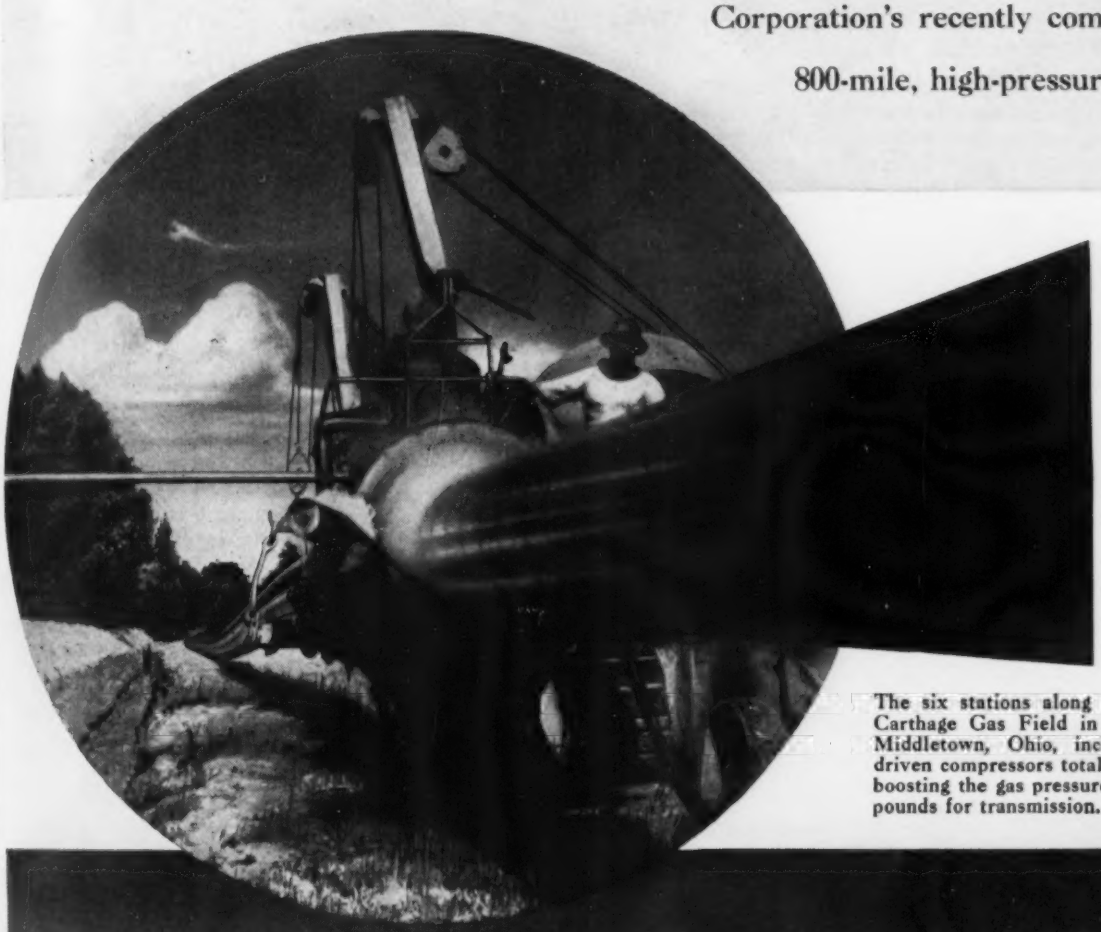
Dry chemical extinguisher; 150-lb powder capacity; one-man mobility.

A wheeled dry chemical fire extinguisher uses two large upright steel cylinders mounted on two wheels, properly balanced to permit one-man mobility. The larger cylinder contains 150 lb of fire-smothering dry chemical, the smaller cylinder holds nitrogen under pressure of 2000 psi. Opening a valve on the nitrogen cylinder admits the nitro-

Turn to Page 89

From East Texas to South Ohio

A current example of Stone & Webster Engineering Corporation's broad experience in design and construction for the natural gas industry is the six compressor stations on Texas Gas Transmission Corporation's recently completed 800-mile, high-pressure line.



The six stations along the line between Carthage Gas Field in East Texas and Middletown, Ohio, include gas engine driven compressors totalling 42,500 hp for boosting the gas pressure from 575 to 800 pounds for transmission.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY OF STONE & WEBSTER, INC.

IRON AGE *introduces*

Clark S. Judd has resigned as chairman of the board of the AMERICAN BRASS CO., New York, and will continue as a board member. **William M. Moffatt**, formerly vice-president in charge of manufacturing, becomes executive vice-president. **Edward M. Bleser** succeeds retiring secretary-treasurer **Edwin J. Rockwell.**

Everett D. Graff, formerly president, was elected chairman of the executive committee of JOSEPH T. RYERSON & SON, INC., Chicago. **Thomas Z. Hayward** was elected vice-president in charge of sales, and also a director and member of the executive committee.

Walter E. LaBelle, appointed assistant general manager of the fabricated steel construction division of BETHLEHEM STEEL CO., Bethlehem. **Frank R. Barnako** becomes manager of compensation and safety, succeeding **Walter F. Ames**, who has retired after 32 years with the company.

Dwight A. Bessmer, formerly director of purchases of the TIMKEN ROLLER BEARING CO., Canton, was appointed assistant to the president. **R. J. Archibald** was named assistant general purchasing agent.

John T. Kiley, executive vice-president of the JAMES FLETT ORGANIZATION, INC., Chicago, has been named president succeeding **James Flett**, who becomes chairman of the board.

Norman W. James, general purchasing agent of the PENNSYLVANIA SALT MFG. CO., Philadelphia, has withdrawn from active service with the company but will continue as a consultant and adviser on procurement problems.

E. R. Pettengill, appointed administrative assistant to the general manager of Pontiac Motor Div. of GENERAL MOTORS CORP., Pontiac, Mich. **Buel E. Starr**, named general manufacturing manager; **A. F. Johnson**, manufacturing manager; **J. P. Charles**, assistant chief engineer; **Charles O. Johnson**, general plant superintendent; and **George Guinn**, axle plant superintendent.

H. S. Geneen, assistant to the vice-president—general services of JONES & LAUGHLIN STEEL CORP., Pittsburgh, has been elected comptroller. **W. H. Dupka**, formerly vice-president and comptroller, will continue as vice-president and a director and will act as special consultant to the chairman of the board and president. **Nils P. Johnson**, appointed assistant to vice-president—general services.

Burton W. Lang, appointed vice-president of the AP PARTS CORP., Toledo. He will continue as director of purchasing and engineering; and also supervision, excluding sales, of the Miracle Power Div.

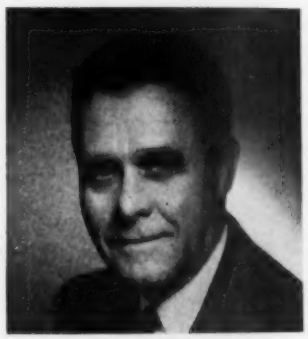
Ernest R. Schmidt, named vice-president in charge of manufacturing of the BUDD CO., Philadelphia. **Raymond F. Littley** becomes vice-president in charge of sales.

E. O. Clark, appointed industrial products sales manager for VICKERS INC., Detroit. **J. C. Carpenter** succeeds Mr. Clark as the Worcester district manager. **M. J. Taup**, formerly district manager of the Chicago office was appointed mobile products sales manager in Detroit.

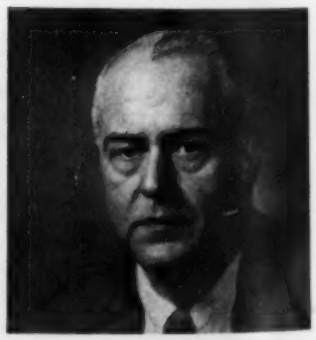
Norman Chandler, president of the Times-Mirror Co. and publisher of the Los Angeles Times, was elected a director of KAISER STEEL CORP.

Turn to page 46

CHARLES L. HARDY, elected president of Joseph T. Ryerson & Son, Inc., Chicago.



JOHN A. COE, JR., becomes president of the American Brass Co., New York.



PAUL E. YOUNG, named director of purchases of the Timken Roller Bearing Co., Canton.

IRON AGE

salutes

Herbert W. Graham

WE hear a lot about far-seeing executives. When we are young we kind of doubt their existence. As we get older we know for sure there are a lot of them. We know also that they don't always shine brilliantly for everyone to see. Many times this is because they shun the limelight.

Such a man is Herbert W. Graham, vice-president-technology, Jones & Laughlin Steel Corp. You can't get it from him that he was co-founder and the first president of the Industrial Research Institute.

You would never know from talking to Herb Graham that years ago he was talking steel quality through better ores and better iron. In his job he was to look years ahead and see what the problems and their solutions will be.

No one can see the future. But those who are properly equipped can make a good guess as to what things will be. Herb Graham's predictions are so good they are almost uncanny.

His forward ideas are not restricted to ore, iron and steel. He was one of the first, years ago, to see the menace of Russian communism—at a time when a lot of people were calling it a noble experiment. In World War II you find that the U. S. Government picked him to head up the part of a little WPB sent to China to bolster their steel and iron production.

Mr. Graham has always had unlimited patience with young people. Many in the iron and steel industry today can trace their ability to get things straight to his personal and heart-to-heart talks. Others can trace their growth to his demand that they think, read and try things no matter how impossible they look.

Herb Graham went from Lehigh to J&L in 1914. What he doesn't know about steel would probably fill a very small pamphlet. But that is not the way he looks at it. He thinks the longer we live the more we find out how little we know. That's why he is recognized by those who know him as a valuable asset to his company, his industry, his friends and his country.

WILLIAM J. FLEMING, appointed vice-president in charge of engineering and manufacturing, General Electric X-Ray Corp., Milwaukee.

FRANK A. STROUCE, appointed general manager, fabricated steel construction, Bethlehem Steel Co., Bethlehem.

ARTHUR H. QUIGLEY, named chairman of the board of the American Brass Co., New York.

PAUL J. LARSEN, appointed assistant to the president of Borg-Warner Corp., Chicago.

IRON AGE *introduces*

Continued

Joseph H. Woodward II, elected a member of the board of directors of WHEELING STEEL CORP., Wheeling, W. Va.

Gunnar Palmgren, appointed assistant vice-president of SKF INDUSTRIES, INC., Philadelphia. **Arthur S. Roberts** was named general counsel and **Jack R. Bremer,** assistant purchasing agent.

F. L. Yetter, appointed senior vice-president of C. H. WHEELER MFG. CO., Philadelphia. He rejoins the company after a 20 month period of service as director of foreign affairs for the Kuljian Corp.

H. J. Henke, named superintendent of the East St. Louis, Ill., bitumastic protective coatings plant of KOPPERS CO., INC., Pittsburgh. **Edward Salner** was made manager of the precipitator department of the Metal Products Div.

Roland E. Govan, appointed sales promotion manager of the FALK CORP., Milwaukee.

Oliver W. Truax, Jr., appointed superintendent of industrial relations for the Donora Steel & Wire Works of AMERICAN STEEL & WIRE CO., Donora.

William S. Lowe, executive vice-president of the A. P. GREEN FIRE BRICK CO., Mexico, Mo., was elected president.

Freeman H. Dyke, appointed manager of U. S. METAL REFINING CO., Carteret, N. J., subsidiary of the American Metal Co., Ltd.

Emil R. Schaeffer, appointed manager of manufacturing, Switchgear Divs. of GENERAL ELECTRIC CO., Schenectady. **John W. Belanger** and **Nicholas M. DuChemin** were named general managers of the Large Apparatus Divs. and Small Apparatus Divs., respectively, of the Apparatus Dept.

Samuel A. Ott, appointed superintendent of melting of the MIDVALE CO., Philadelphia.

Charles S. Lang, appointed comptroller of the EDGEWATER STEEL CO., Pittsburgh.

L. A. Keeler, vice-president, director and comptroller of FAIRBANKS, MORSE & CO., Chicago, has retired after 39 years with the company.

Alphons J. John, named to head the employee-public relation's office at KEARNEY & TRECKER CORP., Milwaukee.

J. Carroll Bateman, appointed assistant director of public relations for the BALTIMORE & OHIO R. R., Baltimore.

Clyde B. Colwell, Jr., appointed assistant district manager for the Twin Cities district of U. S. STEEL SUPPLY CO., St. Paul, Minn.

Kenneth M. Allen, sales manager, was elected a director of the ROCKFORD MACHINE TOOL CO., Rockford, Ill.

William L. Hewes, assistant director of purchases of HERCULES POWDER CO., Wilmington, Del., has retired after 41 years of service with the company.

George E. Tate, formerly assistant treasurer of the FEDERAL FOUNDRY SUPPLY CO., Cleveland, was elected treasurer. He has been with the company for 25 years.

OBITUARIES

Harry Denby, 57, organizer of the Denby Wire & Iron Co., Cleveland, died recently.

John P. Hoelzel, 67, president of Pittsburgh Screw & Bolt Corp., Pittsburgh, died Dec. 26.

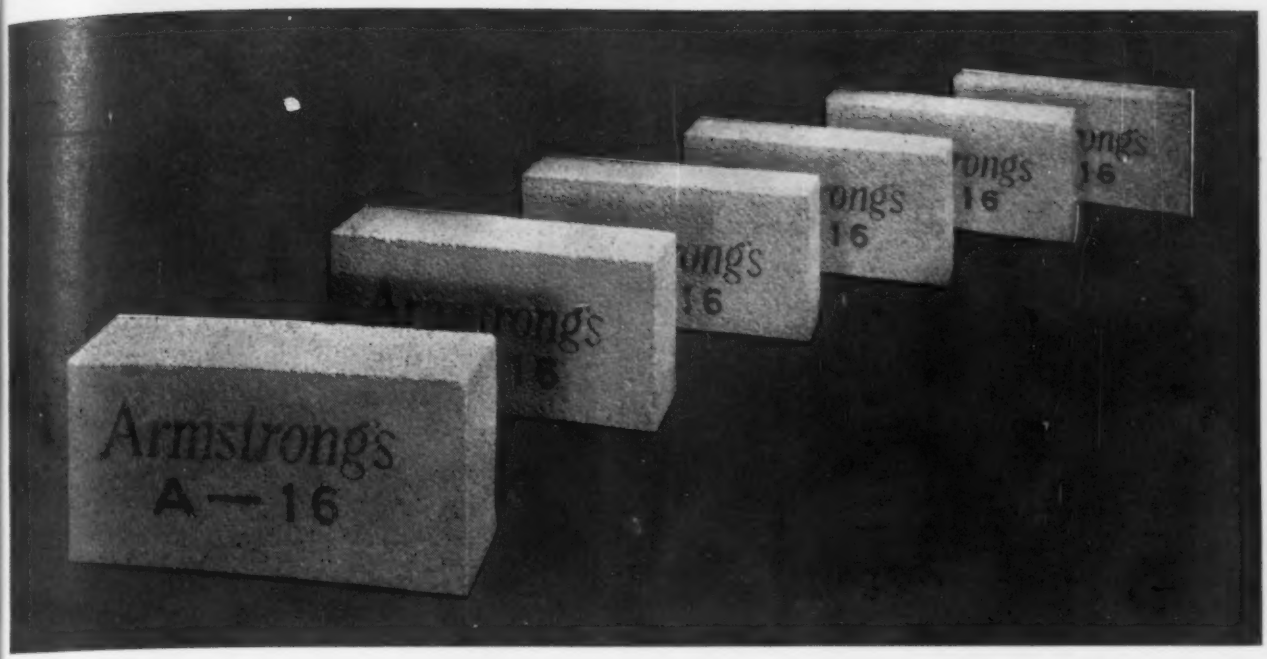
Ernest P. Waud, chairman of the executive committee of Griffin Wheel Co., Chicago, died recently.

G. Walter Sanborn, vice-president in charge of purchasing and traffic for United Engineering & Foundry Co., Pittsburgh, died recently.

Clermont C. Covert, 78, associated with W. & L. E. Gurley, Troy, N. Y., died recently.

Edwin J. Paulus, 62, general manager, fabricated steel construction, Bethlehem Steel Co., died recently.

Newton A. Woodworth, founder of the Ex-Cell-O Corp., Detroit, and N. A. Woodworth Co., Detroit, died Dec. 27.



This improved insulating fire brick simplifies furnace design

To provide furnace builders with greater design flexibility, Armstrong has developed an improved A-16 insulating fire brick. An entirely new formulation gives this brick exceptionally high refractoriness when used directly exposed as furnace lining at temperatures to 1600° F. In addition, it will withstand temperatures to 2000° F. when used as back-up insulation behind insulating brick or fire brick furnace lining.

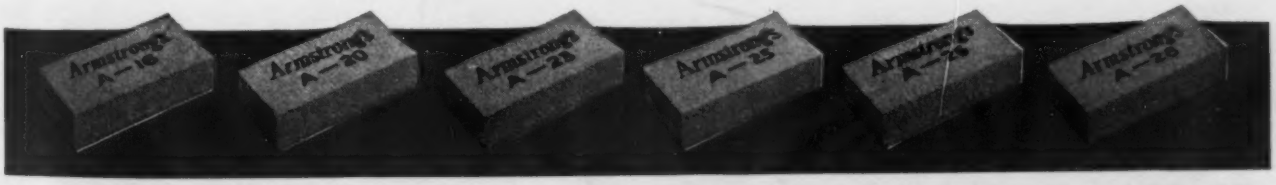
The improved properties of this better A-16 insulating fire brick offer furnace builders these important advantages.

1. At 1600° F., directly exposed, the A-16 will not shrink or soften under load. It provides a wide margin of safety in this application.

2. The ability of the improved A-16 to withstand 2000° F. temperatures behind the furnace lining allows simplification of furnace design by reducing the number of brick types required.

Perhaps the physical properties of this better A-16 Brick can help you improve furnace design and lower costs. Armstrong engineers will be glad to discuss your furnace constructions with you with these factors in mind. Just call the Armstrong office nearest you or write today to Armstrong Cork Company, 4901 Mulberry St., Lancaster, Penna.

Physical Properties of Armstrong's Improved A-16	
Temperature Limit—Direct Exposure	1600°
Temperature Limit—Back-Up Service	2000°
Crushing Strength—P.S.I.	175
P. C. E. Fusion	2984
Weight per Brick—pounds maximum	1.80
Spalling Loss—average per cent	0.05
Shrinkage at 1600° F.—maximum per cent	0.0
at 2000° F.—maximum per cent	1.5
K-1200° Mean—Btu/sq. ft./hr./in.	1.36



ARMSTRONG'S INSULATING REFRACTORIES

on the assembly line

automotive news and opinions

Change rear springs on passenger cars . . . Shortages pose many problems . . . Chrysler building new V-8 powerplant.

by Walter G. Patton

Wider, Longer Leaves — Some interesting changes are being made in the rear springs of passenger cars. The latest spring leaves are wider and longer than those used in 1950 model cars. This improves the ride characteristics and also gives more resistance to sidesway.

In the past, most passenger car models have had 8 to 10 spring leaves in the rear. A 1951 Studebaker model has only three rear spring leaves. Most car producers will use not more than 5 spring leaves in the current models, thereby cutting almost in half the number of spring leaves previously specified.

Aluminum to Cast Iron — The government policy of encouraging the use of non-strategic materials is expected to result in many changes in automobile specifications. Many parts now made of aluminum are being changed over to cast iron. The adoption of cast iron for pistons and automatic transmission parts is already going forward. One manufacturer was surprised to learn he could save more than 80¢ per unit by using cast iron instead of aluminum for a certain transmission part.

Substitutions for Steel—If plastics are available, the industry may see substitutions of plastics (or even rubber) for steel. Scuff boards are an example. Extensive changes in plating are practically a certainty by next spring. Some important changes in the materials specified for bearings are under consideration. The substitution of cast iron for bronze, particularly in large non-automotive bearings, is already being made.

Almost without exception, the use of a substitute or alternate material increases the cost. This is another reason why auto manufacturers who were forbidden a price increase will find it difficult to hold their costs down under conditions of rising prices for materials and substantially reduced volume.

Shutdown of GM Plants—An omen to Detroit was the unanticipated temporary shutdown of five Buick-Oldsmobile-Pontiac assembly divisions because of a "sudden acute shortage of materials." A steel shortage was responsible. The GM BOP plants were closed down for 4 days, idling 13,000 employees. Studebaker Corp. and Chrysler have announced 20 pct cutbacks in production. Similarly, production of 1951 Buick models has been delayed by a shortage of materials at Fisher Body.

Single Leaf—Dead Duck—Considerable experimental work has been conducted to determine the practicability of a single leaf spring for rear suspensions of passenger cars. From an engineering standpoint, a single leaf spring is attractive. However, production costs of such a spring are far out of line. The amount of scrap steel produced is high. Many of the rolls employed today by steel mills to roll spring leaves to shape would have to be discarded.

Single leaf springs also require exceptionally high finish. Finally, the protection offered to car passengers by multi-leaf springs would have to be sacrificed. Detroit auto producers who have investigated the possibilities of single leaf rear springs say this idea is practically a dead duck.

Better Suggestion Pay—General Motors is liberalizing its employees' suggestion plan by increasing the maximum cash award from $1000 to $2500. The minimum award has been increased from $7.50 to $10.00.

Over a 9 year period GM has made awards totaling $5,740,000 for 145,000 suggestions adopted. Average payment is $40 per award. A total of 728 maximum awards have been paid out.

"Out of This World"—Chrysler Div. is getting limited production of its new high compression en-

assembly line

Continued

gines at the Jefferson Ave. plant. While few details of the new powerplants have been disclosed, Chrysler engineers are telling their friends privately that the new engine is "out of this world."

When tooling for the new Chrysler engine was ordered, production estimates were set at 20 engines per hr. This was later increased to 40 per hr. Capacity was later doubled to 80 per hr. Current output is only a few units per day. Deliveries of equipment are still being made to raise the output to 80 engines per hr.

Oldsmobile Changeover — Oldsmobile is changing from coil springs in the rear of its 1951 models to leaf springs. This leaves Buick and Nash as the only cars with coil springs in the rear. Cost considerations as well as engineering advantages claimed for flat springs are believed to have influenced the change.

War Tells on Willys—Including a $63 million military order for Jeeps, Willys-Overland reports a bank of unfilled orders of $173 million. The backlog includes civilian Jeeps, trucks and station wagons, engines and miscellaneous parts.

Willys has received more government orders in the first 7 months of the Korean war than the total number of orders received during the first year of World War II. The new Jeeps are water-proofed to operate under several feet of water. In addition to Jeeps, Willys produced shells, steel and aluminum forgings, landing gears, fuel tanks, fuses and recoil cylinders during World War II.

GM Boosts Horsepower — General Motors Truck and Coach Div. has made several interesting improvements in its 1951 light model trucks. Horsepower of both engines used in the light line has been boosted 4 hp. All models have heavier axle ratings. The front axle of the GMC 1½ ton truck has been increased from 3500 to 4500 lb capacity. A similar increase has been made in the rear axle.

Ventipanes have been added to give controlled cab ventilation. Seat cushions are adjustable. The cushion rests on roller balls that move easily to the desired position when the control rod is touched. Front brakes have been enlarged. Twin cylinders are used for rear brakes instead of single hydraulic mechanism. Some models have a new hand brake of the dual-shoe type.

A Lot of Language—Some idea of the extensive use of automatic teletype by the automobile industry is revealed by the fact that the Dearborn headquarters of Ford Motor Co. handles 12 million words of inter-plant communications per month.

Shortest Inventory Shutdown—The automobile industry has learned a great deal about taking inventory and changing models. An example of the latest technique is offered by Buick. This year Buick started its inventory in the forge shop and foundry and continued on a staggered basis in each of the plants through the next several weeks.

Each plant was idle from only 2 to 4 days. This is the shortest inventory shutdown Buick has ever taken. About 25 pct of the 21,000 hourly-rated Buick employees worked through the inventory. Average lost time per man was 2½ to 3 days.

Cars Cheaper by Pound—The automobile industry can make the point that its cars have improved both from the standpoint of passenger comfort and performance and that its price tags have gone up much less rapidly than food prices. For example, a Chrysler official has pointed out that in 1940 steak was 32¢ a lb and a Chrysler Crown Imperial sedan sold for 94¢ a lb. Today, he argues, steak costs $1.18 a lb and a Chrysler Imperial sells for 85¢ a lb.

Best Ford Year—Ford Motor Co. has just completed its best year in a quarter of a century. Total output of Ford-Lincoln and Mercury passenger cars, trucks and tractors during 1950 exceeded 2 million units. Payrolls aggregated $590 million.

THE BULL OF THE WOODS — **By J. R. Williams**

west coast progress report

digest of far west industrial activity

by R. T. Reinhardt

Won't Take "No" for an Answer —Organized labor, business leaders and politicians in the West are united to bring to the Coast as much government shipbuilding as possible.

These forces insist the historical cost differential of shipbuilding in the West as opposed to that in the East and on the Gulf is more fictional than factual. The Kaiser interests produced approximately 35 pct of all vessels built during the past war with cost records equal to or superior to those of yards in any other part of the country.

Shipbuilders Ask Wage Increase —While the drive was being made to secure ship construction work for the West, the Pacific Coast District Metal Trades Council was asking for an 19¢ hourly wage increase. The existing contract expires June 30. Strikes in the Bay Area and Pacific Northwest have already interfered with ship repair and reconditioning.

It would require about a month to reactivate Richmond Yard No. 3 operated by Kaiser during the past war and those at Vancouver, Wash., Moore Drydock in Oakland, Bethlehem Pacific Coast Steel Co.'s yards and the Todd yards in the south.

Navy Yards Active — Terminal Island facilities in southern California are to be reopened on a full speed ahead basis and more than 6000 employees will be "found," according to a Navy spokesman. It is estimated 80 moth-balled vessels including merchantmen, destroyers, and small Navy ships will be put into shape.

The Navy is reportedly authorizing expenditures of more than $2 million for construction of dikes around the reactivated repair base to keep out sea water since the island has settled during recent years.

Navy reports indicate that orders for ships and equipment on the West Coast already include 30 mine sweepers. Of the 173 cargo barges recently put out to bid for the Army, 43 are scheduled on the West Coast.

Affect on Steel Demands—Reaction of steel users to the shipbuilding program are mixed. All point out that although steel production is several times as great as in 1940, it is still insufficient to meet normal demands and a shipbuilding program will seriously affect the overall economy.

The two principal plate producers in the West—Geneva in Utah and Kaiser in Fontana—have long range commitments for plate for pipe lines and are hard pressed to supply flat stock for hot and cold-rolled sheets.

Shortages Slow Auto Production —California automobile assembly plants are being hit by material shortages. Ford, General Motors and Chrysler have been least affected, but independents report assembly is down 20 to 25 pct.

Studebaker has backtracked to a 4-day week for assembly line personnel, and in Oakland, General Motors Fisher body plant was on a 3-day work basis during the first week of the new year.

The pinch for steel is pointed up by an arrangement completed by General Motors with Geneva Steel Co. and Columbia Steel Co. GM will ship 6000 tons of ingots monthly to Geneva for rolling into plates and hot-rolled strip, and Geneva will ship to points designated by GM. Geneva has rolling capacity in excess of its steel production, and General Motors can get ingots in Chicago.

Perambulating Furnace — In view of the West Coast's pig iron shortage, the rumor that Colorado Fuel & Iron Co. is looking over the idle blast furnace owned by Kaiser-Frazer Corp. at Ironton, Utah, for possible removal to Pueblo, Colo., is particularly interesting. This furnace of 600-ton capacity was originally erected at Duluth, Minn., moved to Joliet, Ill., and then during the past war to Ironton, Utah.

the federal view

this week in washington

by Eugene J. Hardy

Confusion Out of Chaos—Creation of the Defense Production Administration headed by former NPA Chief W. H. Harrison, as second in command to Mobilization Director C. E. Wilson, is another step to establishment of an all-powerful production agency similar to WPB. The executive order giving programming and policy authority to DPA and leaving actual issuance and enforcement of orders to NPA and other existing control agencies creates an administrative monstrosity.

DPA can be compared to the old Supply Priorities and Allocations Board, created in August, 1941, following the breakdown of the Office of Production Management. SPAB was replaced by WPB in January, 1942, and it can be expected that DPA as presently organized will not be long for this world.

Changes Coming—Defense Mobilizer Wilson in announcing the new set-up under the Presidential order admitted that further changes will be coming. DPA Boss Harrison went one step further in his closing staff meeting at NPA when he flatly stated that his new assignment was just another move toward centralized control.

Emphasis on Production—Despite its administrative shortcomings, the new set-up is expected to get production rolling and increased production is highest on Mr. Wilson's list.

Mr. Wilson is also known to be convinced that the DO priority system is unworkable and should be scrapped as soon as possible. This attitude on the part of the No. 1 man in the mobilization picture will hasten the advent of a Controlled Materials Plan.

NE Steels—In addition to increasing nickel production for both domestic and foreign sources, the Senate Armed Services Preparedness Subcommittee recommends that NPA urge the steel industry to produce NE steel wherever the saving in nickel will more than offset the increase in the use of other strategic materials.

The possibility of mandatory orders, if encouragement proves inadequate, is also suggested. The subcommittee also recommended that NPA call in major users of nickel-bearing materials and appoint an industry committee to formulate a workable program for segregation and speedy scrap recovery.

Manpower Problems Decentralized—Manpower problems are being parceled out to a country-wide system of regional and area Management-Labor Committees. The Office of Defense Manpower is setting up 13 regional committees as well as area committees in all labor market areas in which significant manpower shortages exist or impend.

Regional committees will be set up in New York, Boston, Richmond, Philadelphia, Atlanta, Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Denver, San Francisco, and Seattle. The regional committees will be composed of eight members, four from management, including one agriculture, and four from labor, with the Bureau of Employment Security regional director as head.

Work to the Worker—Make-up of the area committees will be similar. The committees will deal with manpower shortages and will also identify unused plant capacity and pools of surplus manpower and call them to the attention of the procurement agencies and prime contractors.

The Office of Defense Manpower, based on World War II experience, will attempt to bring the work to the worker to avoid needless migration and minimize strains on community facilities. Procurement agencies will, insofar as possible, consider the adequacy of labor supplies in specific localities in scheduling production, or building facilities.

INLAND DATA for STEEL USERS

INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

The role of Scrap in Steel Making

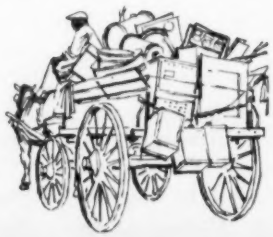
One of the most important raw materials in steelmaking . . . one frequently underrated by the casual observer . . . is iron and steel scrap. With over 90% of all the steel in the U. S. being made by the open hearth process, the scrap used by steel producers totals approximately 50,000,000 tons each year.

The open hearth method of steel production is geared to a pig iron scrap consumption ratio of roughly 50-50. This is to the final advantage of the steel user, since a large scrap diet in steelmaking results in a number of benefits: (a) steel is made faster (since scrap has already been "refined" once before, the "melt" time in the open hearth is decreased); (b) vital raw materials are conserved (it takes almost 4 tons of iron ore, coal and limestone to make a ton of pig iron); (c) unless scrap prices are abnormally high, the price of steel is cheaper; (d) steel is of higher quality (since scrap has already undergone one refining process); (e) transportation facilities, instead of being used for the additional raw materials otherwise required, can be released for other uses; (f) steel mill capacities can be expanded more readily with less emphasis on the blast furnace and more on open hearths and rolling mills.

About two-thirds of the scrap consumed in making steel comes from the steel mills themselves. Crop ends and sheared edges move quickly back to the open hearth shop. The remaining third, flowing to the mills largely through the 6,500 scrap dealers in the U.S., comes from the wastage in metal working plants ("production" scrap), auto graveyards, old building, bridge and ship wrecking projects, railroads (worn rails, freight cars, etc.), neighborhood junk peddlers.

The scrap dealers must sort the scrap so that the undesirables are eliminated, the alloys segregated and the right kinds of scrap can be delivered in large tonnages to the mills for most efficient steelmaking practice.

Today, with steel production at record peaks and with capacity continually expanding, it is more important than ever to keep scrap flowing back to the steel mills from *every* source. Everyone waiting for steel can help himself by assisting the movement of his scrap through his regular channels.



THE SCRAP CYCLE

IRON AGE
FOUNDED 1855
FEATURE ARTICLES

NEW PUNCH

does better job, slashes cost

A new type of punch, straight-ground and with a soft metal sleeve to absorb vibration, can produce holes with straight walls and no burr to replace drilled and reamed holes. It can make holes in stock thicker than hole diameter. Pieces per grind have been upped 700 pct in some cases, and die maintenance cut 80 pct.

By J. R. REINERTSON, *Midwest Engineer*
Pivot Punch and Die Corp., *Chicago*

PRODUCTION experience with a new type of punch perfected about 2 years ago is proving it a versatile and capable aid to tool engineers. The shock absorber punch has reduced punch breakage and increased the number of holes per grind in many varied applications. In addition it is used to perforate material where thickness equals, or is greater than, the hole diameter. And it has produced holes with 100 pct shear, or straight walls and no burr, enabling, in such cases, punched holes to replace drilled and reamed holes at a fraction of the former cost.

Increasing punch life is a question of primary importance to tool engineers. A broken punch means necessary but unprofitable labor. Scrapped parts, lost production, material handling, toolroom labor, and the minutes that an operator stands idle, represent the true cost of a broken punch. Maintenance costs on most production perforating dies are from 2 to 10 times the cost of tooling.

After an analysis of the various reasons for punch wear and punch breakage, the Pivot Punch and Die Corp. developed a method of straight grinding round punches. That is, punches are ground parallel to the punch axis. This increases the life of the cutting edge and eliminates the circumferential fracture lines set up by cylindrical grinding. In addition, the Whipsleeve, a vibration dampener or shock absorber, was developed to reduce punch breakage.

Vibration has proven to be one of the major conditions contributing to die maintenance costs.

Compression of the material in the product also compresses the steel in the punch. The impact as a punch hits the work and becomes subject to this compression, causes high-frequency vibration. The exact frequencies vary with speed of loading, punch size and the duration of compression. This action can be illustrated easily by experience in the toolroom. When a worker tries to chisel steel with a small diameter chisel, the vibration generated at the fulcrum point follows up the body of the chisel and stings his hand. As the result of pain and inability to get the job done with a small pencil type chisel, he therefore uses a heavy body chisel. The larger body chisel with a hard point and the top or head drawn back soft, absorbs the vibration before it reaches the hand. Vibrations in a chisel in the hand work the same way as those of a punch in a die.

Broken Down Edges Don't Shear Properly

At the left in Fig. 1 is the conventional heavy body punch that most toolmakers have standardized on where the center distance of the holes permits. The drawing exaggerates the surface resulting from the conventional cylindrical grind. This grinding leaves circumferential ridges not backed up by metal. The cutting edge is a ridge which rapidly breaks down as the punch enters the metal. With this edge broken down, a wedge, shown exaggerated in the drawing, remains. This changes the punch action from straight shear to a combination of shear and radial compression of material at the sides of the hole. Results are hole shrinkage, increased stripping pressure, and dimpling of stock when punching thin materials. When the microscopic edges of the punch break down direct shear results only from the smaller diameter of the wedge and the hole shrinks around the greater diameter of the punch. Shrinkage around any punch will speed up galling and will tear the hole.

It has been shown that the punch action sets up vibrations. It is a well-known principle of physics that the frequency of vibration of an object varies with the mass. The critical point of a punch, therefore, occurs where its diameter changes. At this point there is interference between the vibration frequency of the point and that of the heavier body of the punch, which produces a concentration of strain.

The different frequencies eventually cause fracture through fatigue. Initially, the incipient cracking progresses slowly and produces a fibrous fracture. When the cross-section area is reduced too far, the punch suddenly breaks because the sectional diameter will not support the strain imposed.

Tests have proven that a dull punch point will increase the die wear much more rapidly than if there is a sharp cutting edge on the punch. The small diameter of the taper or wedge end of the punch might only be a few tenths under the nominal diameter of the punch. But this can cause a side thrust which will exert extreme pressure and cause immediate failure on thin walled compound die sections, and cause trouble with any die set. Maintaining a sharp cutting or broaching edge will reduce the side pressure.

Straight Grind Backs Up Cutting Edge

On the right in Fig. 1 is the Pivot straight-ground punch, with grind lines parallel to the line of action and perpendicular to the probable line of fracture. In this sketch the surface produced by grinding has been exaggerated. The end view shows the effect produced by straight grinding. There is, in effect, a series of broaching teeth that are backed up along the length of the punch. These will not break down and alter the punch diameter, as do the ridges produced by cylindrical grinding.

There are other benefits from straight grinding. It is easier to prevent runout between the punch point and the body of the punch. And, the broaching teeth provide paths for the lubricants often used in punching operations.

The effect of cylindrical grinding is reduced in some shops by honing the point diameter of the punch. This, of course, adds to the cost of each punch, and by increasing the metal-to-metal contact surface, increases generated heat. It is not necessary to hone the straight-ground punch.

The second feature of the Pivot punch is a diecast sleeve of soft metal, which acts as a vibration dampener. This extends down about 1/16 in. below the critical point at which the punch changes diameter. As vibrations travel up the straight point section of the punch, they are absorbed by the soft Whipsleeve.

Fig. 2, illustrating the Whipsleeve, also shows how the sleeve can be used in guiding in a stationary or pressure type of stripper with a straight-through bushing. This permits guiding the punch right where the work is being done. It eliminates any possibility of the punch skidding.

Soft Sleeve Absorbs Vibration

The effect of this type of punch design, with its straight grind and the Whipsleeve, is illustrated in Fig. 3. On the left is the type of hole produced by the conventional punch. Hole diameter is almost never less than the thickness of the stock being punched. The punch shears a straight wall for about 1/3 of the hole. Two-thirds of the hole will break or tear out to a greater diameter than that of the punch, depending on the die clearance. This type of hole is, of course, not suitable for bearing or for subsequent tapping.

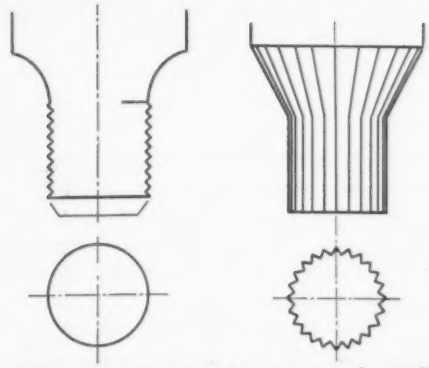


FIG. 1—The surface lines resulting from punch grinding are exaggerated in this drawing. Left, a conventional cylindrically-ground punch. The wedge-shaped tip left by the breakdown of the circumferential ridges left by grinding, shown exaggerated, is the cause of excessive galling. On the right is a straight-ground punch. The ridges left by grinding run parallel to the line of action of the punch and thus are backed up by metal and supported against breaking down.

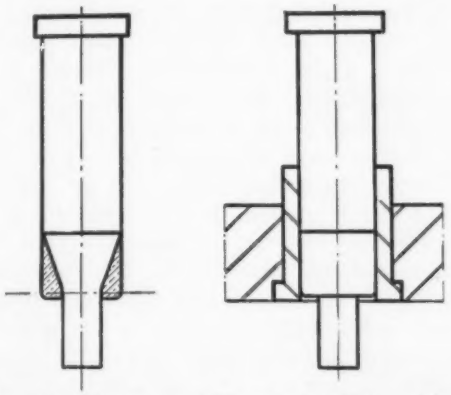


FIG. 2—The Whipsleeve, shown cross-hatched at left, is a diecast soft metal sleeve to absorb punch vibration, an important factor in punch life. The drawing on the right illustrates how the sleeve can be used in guiding the punch in a bushing in the stripper.

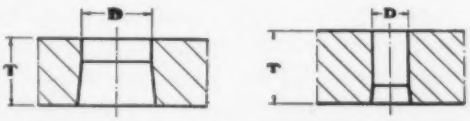


FIG. 3—Conventional punches produce holes like that shown on the left. Barely can T be greater than D. Punch shears for only about 1/3 of hole length. The rest of the hole tears or breaks out, to a diameter greater than that of the punch. A Pivot punch can produce a hole like that on the right, where the D is half of T, and the walls are straight for 2/3 of the hole length. When D is larger in relation to T, the punch can produce a 100 pct sheared hole with straight walls and no burr.

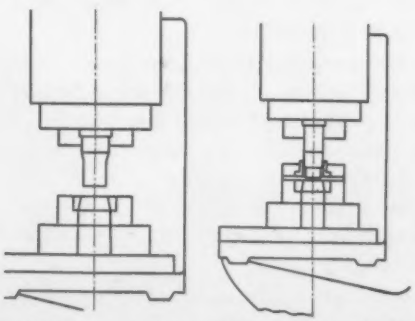


FIG. 4—Misalignment between the punch and the hole in the die block will result from a slight opening of the gap in the C-frame in the setup on the left. On the right, a Whipsleeve punch, guided in a bushing in the stripper, is not so easily thrown out of alignment.

The straight-ground punch, primarily because it retains a sharp edge without the minute reduction in diameter of the cylindrically-ground punch, is capable under proper conditions of producing a 100 pct sheared hole with straight walls and no burr. It can also be used for holes with a diameter less than the thickness of the stock being punched. As shown at the right in Fig. 3, in a hole with a diameter half the thickness of the stock, the punch shears straight for about 70 pct of the hole length.

The limitation of this type of punching is determined by comparing the shearing pressure required to punch the material against the compressive strength of the punch. The compressive strength for the Pivot punch is 405,250 psi. The compressive strength of a specific point diameter would thus be computed by multiplying the area of the punch, in square inches, by 405,250. For good engineering, Pivot recommends that the shearing pressure not exceed two-thirds of the compressive strength of the punch. However, a number of jobs are successfully operating where the shearing pressure exceeds this limitation.

Another important design point is the length of the straight, small-diameter point section of the punch. Keeping this short naturally increases the punch strength. Though punches can be supplied with greater point lengths, in use it is recommended that the length not exceed 1½ times the stock thickness. Also, for difficult work it is well to use as large as possible a ratio of body diameter to point diameter so that the punch will have a maximum mass in the cast sleeve to better absorb vibration.

Sleeve Aids Alignment

Fig. 4 illustrates the value of the use of the sleeve in guiding the punch. Should load cause a slight opening of the gap of the C-frame press, the punch at the left will not match with the hole in the die block. Die posts can be used for aligning, but no 2-in. die post is going to hold the ram straight on a 100-ton press. Such misalignment can greatly increase maintenance and punch replacement costs.

Fig. 4, on the right, shows the punch mounted in the punch pad in the same C-frame press as on the left. It shows how the Whipsleeve is guided in a stationary stripper through a drill bushing. There is no opportunity for the punch to skid and shear the button die. The sleeve is engaged in the guide bushing before the punch contacts the work.

A typical example of use of the Pivot punch is a production job at the P-K Tool & Manufacturing Co. of Chicago. Their blank measures roughly 2 x 2¾ in., of 1010 hot-rolled steel ⅛ in. thick, pickled and oiled. The piece contains six holes, four 0.139-in. diam holes to be tapped, and two holes of 0.174 in. diam. Production with conventional punches was about 8000 parts before the die had to be pulled out because a per-

forator was scored or broken. Vertical honing of the punches increased production to about 12,000 pieces per setup.

More than a million of these parts have now been run at P-K with Pivot Whipsleeve punches. Pieces per setup have averaged 50,000. Replacements for scoring or breakage are less than one punch per 100,000 pieces. Die maintenance costs are less than 20 pct of former costs, and press capacity, due to less downtime, has been increased 15 to 20 pct. This part is shown in Fig. 5.

FIG. 5—Six holes are punched in this ⅛-in. thick AISI 1010 hot-rolled steel blank. Production per setup with conventional punches was about 8000 parts. Honing punches increased this to about 12,000. The Pivot punch gives 50,000 pieces per setup, and has cut die maintenance costs 80 pct.

FIG. 6—The three holes in this automotive hinge plate were formerly drilled and reamed for tapping. Pivot punches produce holes ready for tapping without further operations, at approximately the former cost of burring the reamed holes.

FIG. 7—The nine holes in this automotive transmission part are punched in one stroke, but in three 1/16-in. staggered steps to reduce press load. Hole diameter is 0.312 in., and stock thickness, ⅜ in. Runs of 100,000 pieces have been made without punch breakage or scoring.

At another plant, Pivot punches average 125,000 pieces per grind, while conventional punches lasted only for 15,000 or 20,000 pieces before production was stopped for punch grinding or replacement of a broken punch. The job is punching of television chassis. The die has 300 punches. Punch pad and die block are jig bored. In one run of 300,000 chassis, only six punches had to be replaced, and then only when slugs piled up and caused punch breakage. On another job, production of over 100,000 pieces per grind is obtained in punching five ⅜-in. holes in T-angles of rerolled rails.

The backup hinge plate illustrated in Fig. 6 is a product of the Quality Hardware & Machine Co., Chicago. Four 0.270-in. diam holes are punched in ¼-in. 1020 hot-rolled steel. In this case, 100 pct shear is obtained, and the punched holes are tapped for installation of the hinge on a leading make of automobile. The holes as punched have straight walls and no burr, and are the equal of holes formerly drilled, burred and reamed. The cost of punching these holes is approximately that of burring the drilled holes. The point length on the Pivot Whipsleeve punches used on this job is ⅜ in. It was found that punches with ½-in. point length broke too frequently.

Die Maintenance Cut 85 Pct

The Acme Steel Co., Chicago, produces a unit load anchor used with steel strapping. The 2 x 4-in. part has eight ¼-in. holes and a slot ⅜ x 1⅜ in. Conventional high carbon-high chrome punches formerly used on this job required grinding every 30,000 pieces—about 7 hr production. The average life of a punch was 350,000 parts. Pivot Whipsleeve punches average about 32 hr, or 200,000 parts, between grinds, and average life is 1,700,000 parts. Die maintenance cost is about 1/7 of former costs. The increase in press capacity, Acme figures, is about 1 hr a day. The Pivot punches Acme uses cost about 40¢ more than the conventional punches previously used.

In an automotive automatic transmission part, illustrated in Fig. 7, 9 holes are punched at one stroke, but in three 1/16-in.-staggered steps to reduce press loads. Diameter is 0.312 in. and stock thickness is ⅜ in. These holes were formerly drilled. Trial runs of 100,000 pieces were made without breakage or appreciable wear of the punch.

Since no standard punch will do all jobs, Pivot can supply over 69 million combinations of point diameter, point length, body diameter, overall length, and style. The proper combination is made to give maximum efficiency on each job.

Painting time on power transformer radiators was cut to less than an hour, as compared to from 6 to 24 hr by former methods. One coat of paint is eliminated, but the same film thickness is maintained. Handling is greatly reduced.

FLOW-COATING the primer coat on a radiator; a radiator with the finish coat applied is shown in the foreground.

Painting Speeded

ON BULKY FABRICATIONS

IN the process of developing an improved method for flow-coating power transformer radiators, a number of finishing problems were solved. Some of the methods developed may be of use in handling and painting other long, narrow, complicated assemblies.

No other component of the modern power transformer has been so difficult to coat economically as the cooling radiator. Yet, it is extremely important to obtain good inhibitive and protective films on these radiator surfaces, since they have been the first to give trouble in field exposures over the years.

A large transformer may have as many as 20 or more cooling radiators. Such radiators are constructed with a horizontal, tubular header at each end between which are spaced the vertical cooling tubes; sometimes up to 30 in number. Most large transformers are constructed with detachable radiators to comply with railroad clearance regulations.

If the radiator assembly is painted while detached, it means multiple handling of an awkward piece. If they are attached for coating with the tank, space problems are created within the fabricating shop, and portions of the tank itself are blanketed by the radiators. This makes painting of the tank very difficult.

The general practice had been to vertically flow-coat the tanks and radiators separately by pumping adequate quantities of paint through a hose to a nozzle in the hands of an operator. Complete immersion or dipping was discarded because of the large volume of paint required and the questionable tank stability, over long periods of time, of the available paints.

In contemplating a wholly new painting procedure, the following considerations were exam-

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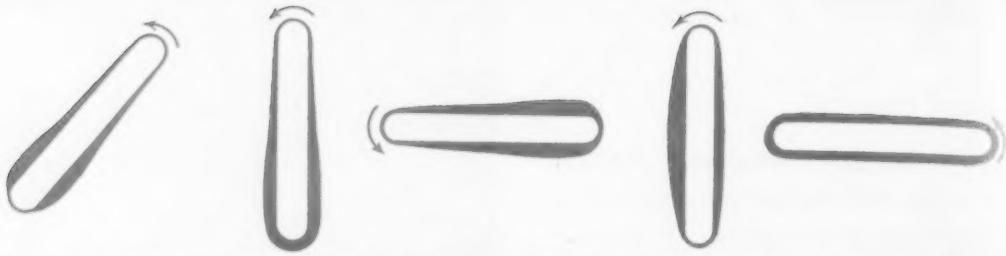


FIG. 1—Successive views of rotation, showing limits of the paint flow and how the paint flowed back and forth before setting up.

ined: (1) Increased production; (2) an improved uniformity of paint film thickness in place of the tapered thin top to thick bottom film, characteristic of the former method; and (3) improvement in handling procedures.

Assembly is Rotated

Past experience with flow coating radiators in a vertical position while hanging from conveyer rails 25 ft above the shop floor was a strong inducement to try other means. A fixture that would hold the radiator in a horizontal position and thus permit working from the floor level at all times was tried. This change in position would also provide the desired uniform film thickness and at the same time facilitate improvements in handling and overall production.

The practicality of flow-coating the assemblies in a horizontal position was examined. Experimentation showed that, with the radiator tube surfaces placed horizontal, after-drippage drain through the tubes would cause unsightly runs and tears.

The only solution was to take advantage of all the different positions the radiators might be placed in; that is, rotate it at slow speeds while the paint was being applied and during the initial setup period. It was felt that this might trap a certain amount of the excess liquid on the tube surface and reduce runs, while simultaneously creating a much thicker applied paint film. This was not only proved correct, but the number of paint coats was reduced from the usual three to two.

Flow-Out Problem Met

It was necessary to actually study liquid flow over the surfaces of the tubes. To this end, a small operating mechanism was constructed. The model was designed to hold short lengths of the tubes, simulating an actual radiator assembly. As nearly as possible, all conditions met in production were duplicated. A variable speed drive for the rotating mechanism was included so that the effect of speed changes could be studied. A blower with its intake over the enclosed drain pit and a paint pump in the circulating system were installed; these insured that no effects of aeration or agitation on the paint would be overlooked.

A number of paint manufacturers prepared samples of both primer and blue-gray finish paint in adequate quantities to operate in the test machine. Some failures were experienced in applying the paint samples. Most of the problems were common to all paints in some degree, but a few seemed peculiar to only one or two formulations.

First and foremost was the matter of flow-out. Because of the two-coat system, heavier coats of paint were applied. This produced a condition similar to a brush-out application. Fig. 1 shows the limits of the paint flow and how the paint flowed back and forth over the surface before setting up.

The volume of paint in flow never completely circled the tube, but stopped short in each revolution. As the setting-up process advanced with thinner loss, the flow was reduced from an overall and unbroken flow front to many separate scalloped fronts. In an improperly formulated paint, these separate scalloped fronts failed to flow out laterally and were set up and baked as solid runs or ridges over the surface.

This failure was the one most commonly experienced with the different primers and the one most difficult to correct. Only one primer submitted worked perfectly at the first trial. It consists of zinc oxide, zinc chromate, and iron oxide pigments in a straight alkyd varnish, plus thinner and driers. This material has been in production for several months and to date has been completely trouble-free.

Bubbles Are Produced

When the stream of paint flowing at high velocity strikes the surface to be coated, numerous bubbles are produced. Many bubbles are also found in the circulating system if there is excessive turbulent flow. The same is true if the pump operates at insufficient static head in the drain pan, causing de-thinning of the paint as it passes through the pump. Improperly formulated paint forms bubbles which do not readily break on loss of solvent. These bubbles dry and bake as blisters in the film. Moreover, if the bubbles break late in the setting-up process, they will have a crater with a thin bottom.

Another difficulty encountered was in obtaining proper flow-out consistent with rapid setup. The frequent adjustment in obtaining smooth primer surface was to substitute higher and higher initial boiling point thinners; this increased setup time. In at least one case, setup

time was over 45 min while the successful primer set up in 10 min. A 10-min performance was necessary for higher production.

Desired film thickness for the primer coat was 1.0 mil. Several of the primers submitted met this minimum, although in attempting to obtain a thick film it was necessary to use fairly high viscosities. In several instances, this resulted in an unsatisfactory flow-out condition.

The important problem, after the proper primer formulation had been made, was to correctly balance choice of the thinner initial boiling point range with viscosity. In several trials, corrections made in the formulation to eliminate one fault produced another, sometimes worse than the first, resulting in bubbles in the film.

Color Float Appeared

Trials with the finish coating disclosed not only the same problems encountered in the primers, but also the serious one of color float or pigment separation. This occurred particularly in paints containing more than one colored, opaque pigment and especially in dark gray coatings having a high percentage of black pigment. Only one finish paint consistently performed without apparent float. The most commonly observed float first appeared, depending on the thinner evaporation adjustment of the mix, from 30 sec to one min after application.

A dark wash developed at the flow front; as this progressed and setting-up advanced, the wash broke down into a number of dark and light streaks, which finally became fixed across the tubes normal to the long axis. This was observed in varying degrees in all of the finish coats except one. The desired film thickness for the finish was set at 2.0 mil to provide a total of 3.0 mil film thickness for two coats.

As with the primer, difficulties were encountered in obtaining smooth flow-out, adequate film thickness, rapid setup, high gloss, and absence of color float. One manufacturer was successful in completing satisfactory primer and top-coat trials, and was chosen to conduct further trials on the full-scale coating machines which had meanwhile been installed. The finish paint consists of titanium oxide, tinting color, inert and special-purpose pigments in a straight alkyd vehicle, plus thinners and driers.

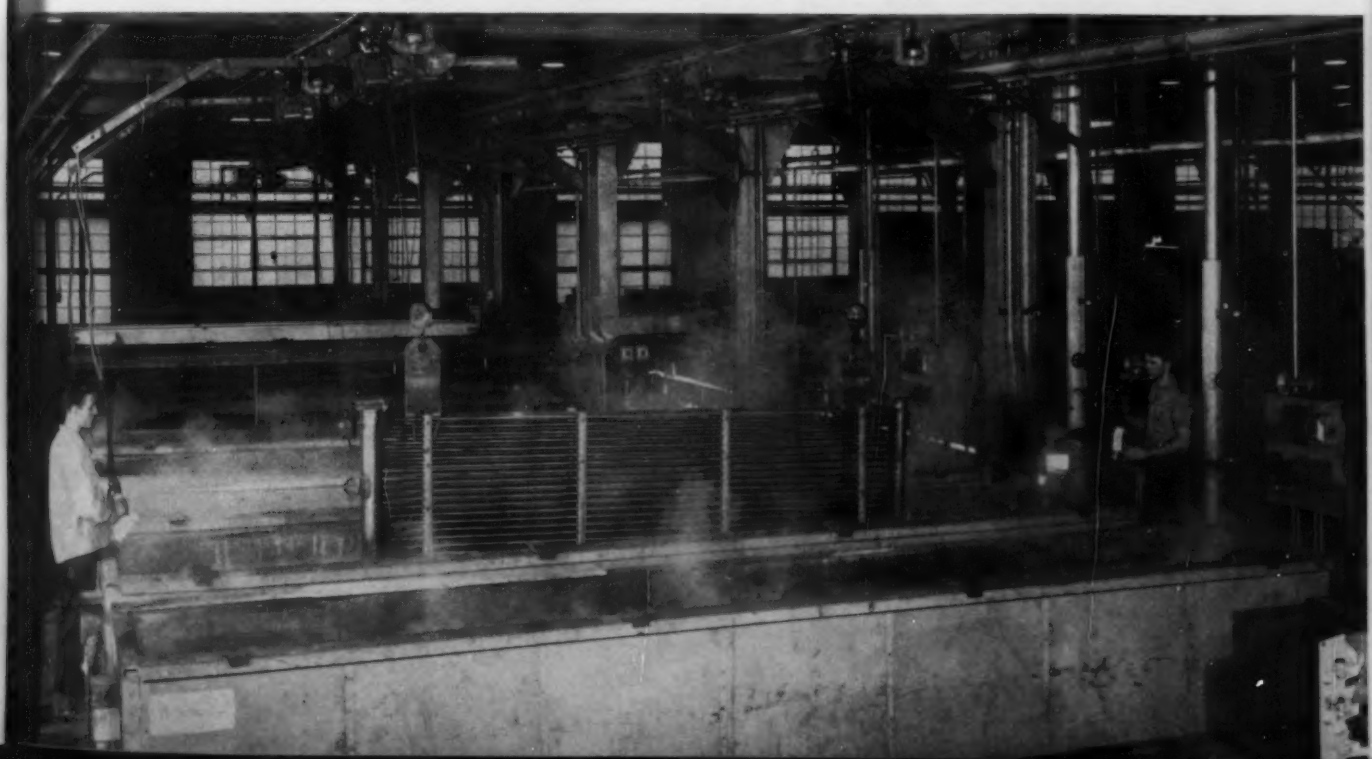
The photo on p. 59 shows the coating machine from above, indicating the size of the unit and the radiators being coated. The full-size machine was built on the same principle as the test model, except for the radiator holding fixture. The fixture was originally conceived as a cage-like rack, extending the full length of the catch tank; this was supported by bearings at each end and chain driven at one end from an adjustable speed motor.

Holding Simplified

The radiators were lowered into the rack from above and clamped, according to their length, at two appropriate places. This rack was satisfactory, except that it was difficult to keep clean and furnished repositories for paint which later dripped down on to the radiator. The rack was completely eliminated and substituted by a holding fork at each end of the radiator. Each fork was mounted on a stub overhung shaft and supported by spaced ball bearings. The driving fork was fixed, but the idling fork was mounted in bearings supported by a carriage which ran on a rail at front and rear of the catch tank.

The carriage was equipped with drive chains between the axles so that ample traction was available to traverse with a hand crank. A hand

FIG. 2—The five-stage Bonderizing system used for hot-dip cleaning and phosphating of the transformer radiators. Assemblies up to 20 ft long are handled.



clamping wheel was furnished so that the adjustable fork could be locked, holding the radiator firmly for rotation. This reduced the amount of fixture requiring cleaning and practically eliminated damage to the paint film resulting from contact with the fixture. Only four small areas on each header need repainting by brush.

Not all the characteristics of the model were carried over to the production operation. A transverse surface, represented by the cylindrical headers, was introduced for the first time. In spite of this difficulty, perfectly smooth, rapid-setting prime coats of the proper thickness were obtained at the end of the first day by changing the viscosity.

Inconsistent Behavior

This success was not repeated, however, with the finish coat. Several weeks of intensive development and numerous adjustment trials on the machine were necessary. Color float was the serious obstacle. It was shown that a coating which would produce almost perfect results on a prototype might be subject to color separation on the full-scale radiators.

This inconsistency has been closely examined, but to date no set of conditions has been isolated to account for it. Through subsequent reformulation in the coating and final adjustments of the machine, it became possible to produce radiators, complete with headers, having extremely good appearance. A smooth surface and high gloss, including rapid setting-up time, and a total average film thickness of 3.0 mils resulted.

The new system makes possible straight line handling of a heavy, awkward fabricated shape in a relatively small floor space. The fabricated, tested radiators are delivered to the finishing department, laid down in the position they are handled throughout. The assemblies are first hand-wiped to remove soil and carbon smudge, which is difficult to clean off by an alkaline bath. They then move progressively through the five stages of a standard hot-dip cleaning and phosphating (Bonderizing) treatment, as shown in Fig. 2. Throughout the entire system, all handling is accomplished by two tractorized hoists running on separate monorails, supporting the ends of the radiators.

All dip tanks are 20 ft long to accommodate the largest piece manufactured. Short radiators are handled two at a time. The entire cleaning and phosphating processes consume about 22 min up to the time the pieces are delivered to another small lay-down space, ready to coat. They are then moved to the prime coating machine (p. 59) for coating, which takes approx 1 to 3 min. The machine revolves at 1 rpm during painting and while the primer sets up, consuming another 8 to 14 min, depending on the ambient temperature and humidity.

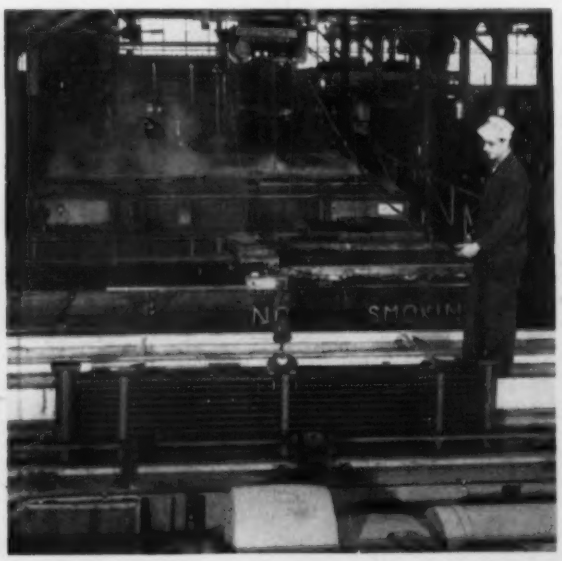
Coating Time Reduced

After set-up they are immediately moved over and past the finish-coat machine to the horizontal, top-opening oven, Fig. 3, and baked at 350°F for 15 min. Four electric timers furnish red light warnings at the completion of the set-up periods and at the termination of the baking cycle for both prime and finish coats. The radiator is laid down to cool and then placed in the finish coat machine. The coating time, setup time and baking time for this coat is approximately the same as for the primer. After baking, the radiator is moved to another small lay-down space and readied for the shipper. The whole operation, including cleaning and phosphating, is complete in 1 hr. The old method required from 6 to 24 hr for the three-coat paint film of equal thickness.

Several future refinements will further increase production and possibly reduce the number of working shifts. Preliminary experiments on applying the finish coat directly to the radiator, while still hot from the first bake, show considerable promise. This decreases the cooling time required between prime bake and finish application. It also makes possible a finish set-up time of approx 4 to 7 min. These trials were performed with properly adjusted paint on radiators at about 165°F.

This new procedure can prove advantageous to many manufacturers of bulky fabrications of irregular shape. It makes possible the application of a smooth, glossy, uniform film to irregularly-shaped objects with a minimum of turning, handling and coating, and does all this in a small, low space.

FIG. 3—A transformer radiator being removed from the baking oven after baking for 15 min at 350°F.



SWING GRINDING a huge Monel pickling hook, cast at Cooper Alloy Foundry Co.

Cast USES BROADEN FOR Monel

By N. S. MOTT
Chief Chemist and Metallurgist
The Cooper Alloy Foundry Co.
Hillside, N. J.

MONEL is the proprietary trade name (International Nickel Co., Inc.) given to a two-thirds nickel and one-third copper alloy; it was originally formed by the metallurgical reduction of a naturally-occurring mixture of copper and nickel ores. This reduction alloy was found to have valuable properties of corrosion resistance and mechanical strength. It was considered more advantageous to market it as such, rather than go through the exceedingly difficult and expensive separation of its components.

For many years, Monel has found widespread and diversified uses in chemical, pharmaceutical, food, textile, laundry, oil refinery, paper and pulp, architectural and household applications. It has also proved useful in many of the commonly encountered corrosives, such as sea water, dilute reducing acids, halogen gases, neutral and alkaline salts, non-oxidizing acid salts and strong caustic solutions.

The use of Monel in the cast form, in which the desirable corrosion resisting properties are maintained along with high strength and ductility, has become increasingly popular for shapes difficult or costly to fabricate. Castings can be made both in sand and permanent metal molds—according to standard static casting procedures as well as by recently perfected centrifugal methods. They are produced in three types of analyses, as shown in Table I, varying chiefly in silicon contents. The higher silicon alloys are used where greater hardness, strength and resistance to erosion or galling is desired, with some sacrifice as to ductility and shock resistance.

The use of cast Monel does not show a growth picture to equal what would be expected from an

Great care must be taken in melting Monel, or brittle metal may result. When handled properly, a wide range of desirable physical and mechanical properties can be had with good weldability and machinability.

examination of its properties, shown in Table II. The big reason for this lag is the fact that too many foundries have been careless of controls. Great care must be taken in melting Monel or brittle metal may result.

When Monel is heated to too high a temperature before pouring, oxidation or burning takes place despite the protective slag. An oxide film forms around the grains as they solidify, almost completely destroying the adhesion between them. This condition may also occur on the surface of the metal when it is heated in an oxidizing flame during welding or annealing operations.

Glass Slag Protects Melt

Monel metal burns so readily that crucible and induction melting are very difficult. Unless the metal is thoroughly protected from the air, brittle castings will result. Good practice is to melt in an acid arc furnace and protect the melt with a glass slag. When difficulty in melting scrap is experienced, calcium metal to the extent of 2 lb per 1500-lb heat is added to quiet the bath.

Pouring temperatures range from 2550° to 2600°F for large castings, and 2750° to 2800°F for small ones where running is difficult. No greater temperatures than 2800°F should be used if burning is to be avoided. To prevent embrittlement from the presence of sulfur, 1 oz of magnesium per 100 lb of metal is added to the ladle before pouring.

Sulfur, even in small amounts, may impair strength and lower ductility. It takes the form of a film or envelope of the eutectic of nickel and nickel sulfide or copper sulfide, around the grain boundaries. In casting, these sulfides are the last of the melt to solidify, distributing themselves between the primary grains with extremely damaging effects to strength and ductility.

Treating the molten metal with magnesium before casting causes the sulfur to combine forming a compound of high melting point. This replaces the eutectic envelope with granular particles of magnesium sulfide. In such form and random distribution, the sulfur will not interfere with strength and ductility.

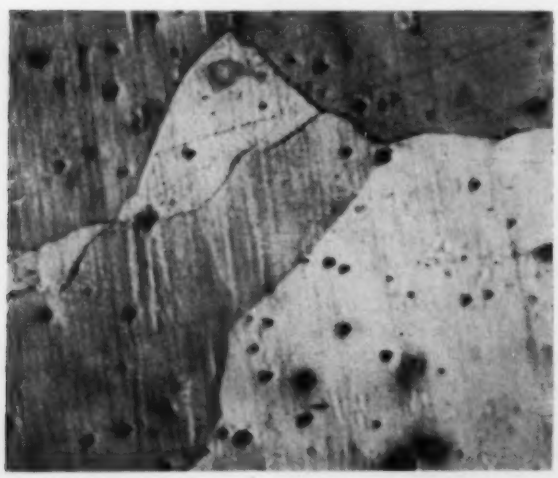
Monel contains a small amount of carbon, which promotes fluidity and facilitates the production of sound castings. If it remains in solid solution, carbon does not have a serious effect on mechanical properties or corrosion resistance. If it is precipitated as graphite, however, serious reduction in strength and toughness may result. The presence of silicon reduces the solid solubility of carbon in Monel. The maximum amount of carbon to be tolerated is controlled by the silicon content. Standard recommendations show a maximum of 0.30 pct C for cast Monel; however, for "S" and "H" alloys, 0.15 pct C and even as low as 0.10 pct C may be preferable.

Forms Dendritic Structure

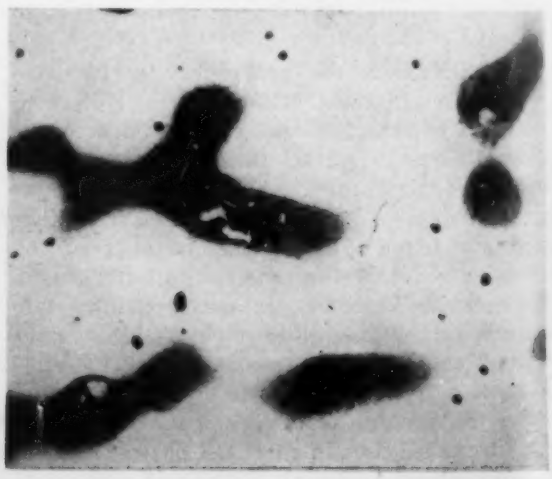
When a Monel casting solidifies, the crystals which first form are richer in nickel than the molten metal itself. The solidification proceeds too rapidly to permit smoothing out of this inequality; the cast metal, when entirely set, consists of tree-like skeletons of nickel-rich crystals within the arms or branches of which progressively more copper-rich metal has solidified. The metal thus has a cored or dendritic structure. Cast Monel metal is weakly magnetic, while the two silicon Monel alloys "S" and "H" are substantially non-magnetic.

Monel from its position in the electrochemical series is relatively noble; consequently, it does

Cast Monel containing 1.5 pct Si. 500X.



Monel "H" with 3.0 pct Si. 500X.



not readily evolve hydrogen from solutions in the absence of depolarizing agents. It is therefore most resistant to corrosion when conditions are reducing; the presence of oxygen or oxidizing agents, which facilitates the liberation of hydrogen, tend to promote attack. This resistance to corrosion under reducing conditions makes Monel very useful in some applications where stainless steels do not fare so well.

Being a non-ferrous alloy, Monel does not rust and discoloration and contamination from this source is obviated; however, Monel will tarnish in sulfur-bearing humid atmosphere. Monel does not suffer from the intergranular or pitting form of corrosion such as occurs in the austenitic chrome-nickel alloys; it also offers greater resistance to the effect of cavitation and impingement in salt water at high velocity.

Stress-corrosion cracking in hydrochloric acid or in chloride solutions and caustic embrittlement in strong caustic solutions are unknown. Monel is sensitive to increasing velocity of solution and this may be expected to somewhat increase the corrosion rate; also, its corrosion products are usually quite soluble and protective films from that source are not produced.

Used For Handling Acids

A most common use for Monel is in the handling of acids under reducing conditions. Sulfuric acid corrosion is resisted by Monel in concentrations of less than 80 pct at most temperatures, and hydrochloric acid may be handled by Monel in concentrations up to 20 pct at 160°F. The introduction of air or oxygen results in an accelerated rate of corrosion in these acids and is to be avoided. The presence in the acids of oxidizing salts, particularly those of iron or copper, may be expected to increase corrosion markedly.

In a variety of applications involving hydrofluoric acid, Monel has shown itself to be usefully resistant to all concentrations, including the anhydrous acid, over a considerable range of temperatures. In aqueous non-aerated solutions of hydrofluoric acid, Monel has shown satisfactory resistance up to 250°F. Here again aeration appreciably increases corrosion rates and denickelization may occur in the acid when under pressure in the presence of air; however, aeration is not generally encountered in the closed vessels associated with operating equipment handling hydrofluoric acid.

TABLE I

CAST MONEL ALLOYS

Chemical Composition, Pct

Type	Ni	Cu	Fe	Mn	Si	C	S
Monel	63	32	1.5	0.75	1.5	0.15	0.015
Monel "H"	63	31	2	0.75	3	0.10	0.015
Monel "S"	63	30	2	0.75	4	0.10	0.015

Monel "S" and "H" show resistance equal to that of ordinary Monel in all acid media. In neutral and alkaline salts Monel shows good resistance, even in hot, aerated solutions. It is also quite resistant to acid salts if they are non-oxidizing and the solutions are free from air.

Monel is highly resistant to solutions of caustic alkalies at quite high concentrations and temperatures, being exceeded only by pure nickel. The corrosion rate of Monel in caustic solutions below 55 pct concentration is low at all temperatures, and aeration does not increase the rate. However, in the range of 55 to 75 pct of concentration, nickel is to be preferred, and above 75 pct, Monel corrodes too rapidly to be practical.

Resists Fluorine Action

At high temperatures, Monel is very useful in handling anhydrous halogens and halogen acids. It will resist the action of fluorine and hydrogen fluoride up to 1000°F, chlorine up to 800°F, and hydrogen chloride up to 450°F. In the absence of sulfur, Monel is resistant in an oxidizing atmosphere to 2000°F, and in a carbon monoxide reducing atmosphere to 1500°F. When sulfur is

Monel "S" with 4.0 pct Si. 500X.

"Burnt" Monel showing oxidized grain boundaries. 500X.

TABLE II

CAST MONEL ALLOYS

Mechanical and Physical Properties

ALLOY	Monel	Monel "H"	Monel "S"		
HEAT TREATMENT	As Cast	As Cast	As Cast	Annealed	Hardened
Tensile Strength, 1000 psi	65 – 90	90 – 115	110 – 145	90	110 – 145
Yield Point, 1000 psi	32 – 40	60 – 80	80 – 115	65	80 – 115
Elongation in 2 in., pct	25 – 45	10 – 20	1 – 4	3	1 – 4
Hardness, Bhn	125 – 150	175 – 250	275 – 350	225 – 260	300 – 375
Charpy Impact, ft-lb	70	40	4		
Izod Impact, ft-lb	65 – 80	35 – 45	3 – 9		1 – 5
Modulus of Elasticity, 1 million psi	18.5	20	21	20.5	21.5
Specific Gravity	8.63	8.48	8.36		
Density, lb per cu in.	0.319	0.313	0.302		
Thermal Conductivity, Btu per sq ft/hr/°F/in.	180	180	180		
Specific Heat, Btu per lb per °F	0.127	0.129	0.130		
Melting Point, °F	2400 – 2450	2350 – 2400	2300 – 2350		
Resistivity, ohms per cir. mil ft	290	370	380		
Coefficient of Thermal Expansion, x 10^{-6}					
70° to 212° F	7.8		8.8		
70° to 570°F	8.3		8.2		
70° to 1100°F	8.9		8.7		

TABLE III

CORROSION RESISTANCE OF CAST MONEL

ACIDS

Acetic 5%, 70 F * G
Acetic 5%, boiling E
Acetic 80%, 70 F * G
Acetic 80%, boiling E
Acetic Glacial, 70 F * E
Acetic Glacial boiling E
Benzoic 5%, 70 F E
Boric 5%, 176 F E
Chromic 10%, 70 F G
Chromic 10%, boiling N
Chromic 50%, boiling N
Citric 5%, 70 F E
Citric 25%, boiling G
Citric 50%, boiling G
Formic 5%, 70 F G
Hydrochloric 1%, 70 F * F
Hydrochloric 1%, boiling P
Hydrochloric 5%, 70 F * F
Hydrochloric 5%, boiling P
Hydrochloric 25%, 70 F P
Hydrochloric 25%, 176 F P
Hydrofluoric 48%, 70 F E
Hydrofluoric 48%, 176 F G
Lactic 5%, 70 F G
Malic, all temps. G
Nitric all concs., 70 F N
Nitric 65%, boiling N
Oleic all concs., all temps. E
Oxalic 5%, boiling G
Phosphoric 10%, 70 F * G
Phosphoric 85%, 70 F * E
Phosphoric 85%, boiling F
Stearic conc. to 200 F E
Sulfuric 2%, 70 F * G
Sulfuric 2%, 176 F * F
Sulfuric 2%, boiling F
Sulfuric 5%, 70 F * G
Sulfuric 5%, 176 F * F
Sulfuric 5%, boiling F
Sulfuric 10%, 70 F * G
Sulfuric 10%, 176 F * F
Sulfuric 10%, boiling F
Sulfuric 78% (60° Be), 176 F N
Sulfuric 93% (66° Be), 70 F F
Sulfuric 93%, 300 F N
Oleum, 70 F N
Mixed Acids 57% H_2SO_4, 28% HNO_3, 176 F N

ALKALIES

Ammonium Hydroxide, all concs. F
Calcium Hydroxide, 10%, boiling E
Calcium Hydroxide 50%, boiling E
Sodium Hydroxide or Potassium, all concs., 70 F E
Sodium Hydroxide <20%, boiling E
or Potassium 30%, boiling E
Potassium, Molten, 600 F G

NEUTRAL & ALKALINE SALTS

Barium Sulfide, 70 F E
Calcium Chloride 5%, 70 F E
Calcium Sulfate Sat., 70 F E
Magnesium Chloride 5%, 70 F E
Magnesium Sulfate 5%, 70 F E
Sodium Carbonate, all concs., 70 F E
Sodium Chloride 5%, 70 F E
Sodium Sulfate 5%, 70 F E
Sodium Sulfide 5%, 70 F E
Sodium Sulfite 5%, 70 F E

ACID SALTS

Alum 10%, boiling G
Aluminum Sulfate 10%, 70 F E
Ammonium Chloride 5%, 70 F G
Ammonium Sulfate 10%, 70 F E
Ammonium Sulfate 10%, boiling G
Ammonium Nitrate, all concs., 70 F E
Stannous Chloride 5%, 70 F G
Zinc Chloride, 5%, Boiling G

OXIDIZING ALKALINE SALTS

Calcium Hypochlorite 2%, 70 F P
Sodium Hypochlorite 5%, 70 F P
Sodium Peroxide G

OXIDIZING ACID SALTS

Ammonium Persulfate 5%, 70 F N
Cupric Chloride 1%, 70 F N
Cupric Sulfate 10%, 70 F F
Ferric Chloride 10%, 70 F N
Ferric Sulfate, boiling N
Mercuric Chloride 2%, 70 F N
Stannic Chloride 5%, 70 F N

WET AND DRY GASES

Chlorine Gas Dry 70 F G
Chlorine Gas Wet, 212 F N
Sulfur Dioxide Dry, 575 F G
Sulfur Dioxide Wet, 70 F F
Sulfur Dioxide Solution, 70 F F
Sulfur Dioxide Spray, 70 F F
Hydrogen Sulfide Dry G
Hydrogen Sulfide Wet G

ORGANIC MATERIALS

Acetone, 70 F E
Acid Sludge (50% H_2SO_4), 200 F N
Alcohol—Methyl & Ethyl E
Analine Hydrochloride, 70 F G
Benzol, 176 P E
Carbon Tetrachloride E
Chloroform E
Ethyl Acetate, 70 F G
Formaldehyde, 70 F E
Phenol 5%, boiling G
Refinery Crudes G
Trichlorethylene, boiling E

PAPER MILL APPLICATIONS

Kraft Liquor G
Black Liquor G
Green Liquor G
White Liquor G
Sulfite Liquor, 176 F N
Chlorine Bleach P
Paper Makers Alum G

PHOTOGRAPHIC INDUSTRY

Humid Atmospheres E
Cellulose Acetate G
Acetic Anhydride E
Acetic Acid + .1% H_2SO_4 E
Developers G
Solutions Containing SO_2 E
Silver Nitrate, 70 F N

FERTILIZER MANUFACTURING

H_3PO_4 + H_2SO_4 + HF P

PICKLING OPERATIONS

H_2SO_4 + Dichromate, 176 F N
H_2SO_4 + Hcl, 176 F G

CORROSIVE WATERS

Acid Mine Water P
Abrasive Acid Mine Water N
Sea Water E
Brackish Water F

FOOD AND ASSOCIATED PRODUCTS

Brines E
Edible Oils E
Fats E
Fatty Acid Distillation G
Fruit Juices G
Ketchup G
Milk Pasteurizing G
Vinegar & Salt, 70 F F

RATINGS:

E—Excellent resistance. 0.004 max. in. per year of penetration. Corrosion so slight as to be harmless.
G—Good resistance. 0.004-0.042 in. per year of penetration. Satisfactory service expected; at most a slight etch.
F—Fair resistance. 0.042-0.120 in. of penetration per year. Satisfactory service under specific conditions. Light to moderate attack.
P—Poor resistance. 0.120-0.420 in. of penetration per year. Satisfactory for temporary service only.
N—No resistance. 0.420 min. in. of penetration per year. Rate of attack too great for any use.
*—Subject to pitting type corrosion.

present it is resistant under oxidizing conditions up to 600°F, and under reducing conditions to 500°F.

For non-galling, wear and erosion resisting castings with high hardness and strength as well as high corrosion resistance, it is most advantageous to use silicon as an alloying element to induce precipitation hardening. Two grades of castings of this type are regularly produced, Monel "S" with 4 pct Si and Monel "H" with 3 pct.

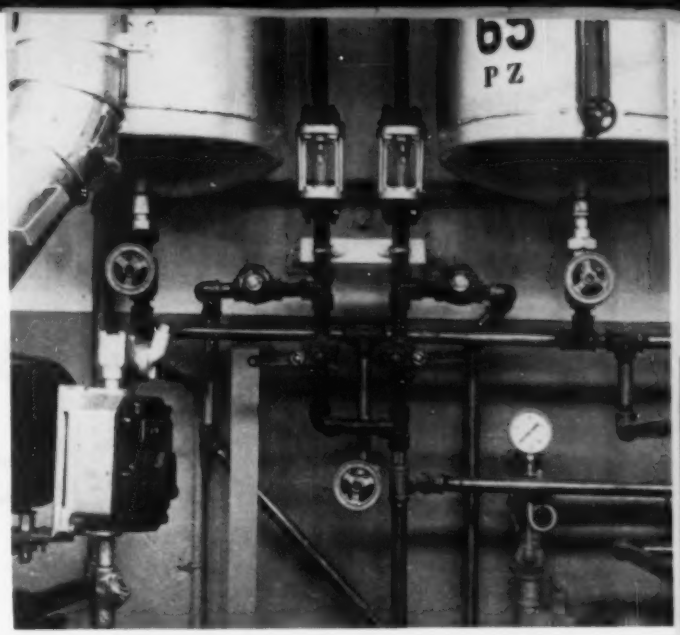
Because of its non-galling quality, it is possible to combine Monel "S" with regular Monel in moving assemblies, where scoring and seizing are encountered with other materials. The silicon addition forms a nickel silicide; this is precipitated as a dispersion of fine particles throughout the solid solution matrix. The quantity and form of this nickel silicide determines the hardness and mechanical properties of the alloy.

Although it takes about 3.5 to 4.5 pct Si to produce good hardening characteristics in the ordinary Monel composition, additions of from 2.5 to 3.5 pct produce some partial hardening; these are useful for obtaining intermediate hardness with better ductility. All silicon additions seem to work in the direction of better corrosion resistance, with the exception of alkaline attack.

Welds Readily

Monel metal may be readily welded by either the arc or oxyacetylene torch methods; in the case of the latter, however, a reducing flame is necessary to prevent the formation of copper oxide film around grains, which produces brittleness and loss of corrosion resistance. In the case of complicated castings, a preheat of 200° to 300°F is desirable. No intergranular corrosion is caused by the welding, and neither ductility or strength are altered noticeably. Post heat treatment is not necessary except for special reasons, such as stress relieving a fabricated structure. Passivation is not required to preserve corrosion resistance. Welding of Monel "S" and "H" is not recommended because of too great a tendency toward cracking. Only mechanical joints should be used with these alloys.

The machinability of regular Monel castings is good. That of Monel "H" is fair, and Monel "S" castings must be annealed by heating to 1650°F followed by air cooling to be made fairly machinable. After machining, Monel "S" must be re-hardened for use by heating at 1100°F for 4 hr followed by furnace cooling to 600°F, from which point it is air-cooled. In this state, it has a hardness of from 300 to 400 Bhn and is very erosion and galling resistant.



CAST MONEL VALVES and fittings handle corrosive hydrochloric acid solutions for Ciba Pharmaceutical Products Co.

Large Meters Easily Read At A Distance

KING-SIZED electric meters, believed to be the largest ever built, will enable speeds and feeds to be read from a distance by the operators of Allis-Chalmers' new 27-ft boring mill. The size of this tool and the large workpieces it will machine mean a large operating area, and large meters were desirable so operators could read them easily and accurately from anywhere in this area.

Ordinarily when a large size indication of meter readings is desired, motion of the elements of a meter of conventional size is transmitted to an indicator on a large dial by means of a selsyn system or similar device. But this amounts to magnification of the meter reading, so any meter error is also magnified. Also, response to changes in the value being measured is slowed. So for accuracy and response, it was preferable to build a direct-indicating meter on a scale to match the desired indicator dial size.

The largest meters known to have been built heretofore had dials 11 in. in diameter. But for A-C's new Lima-Hamilton boring mill, the Dittmore & Freimuth Electronics Engineering Co., Milwaukee, has built accurate meters 20 in. in diameter, with 8-in. indicator needles—believed to be the world's largest.

WELDED AND BRAZED BRAKE BANDS USE 60 PCT LESS STEEL

By W. H. HAVILAND (l.)
Chief Process Engineer
and S. M. SPICE (r.)
Chief Welding Engineer
Buick Div., General Motors Corp.
Flint, Mich.

UNTIL recently brake bands for the Buick Dynaflow transmission were hogged out of rings. These rings were formed from stock 9/16 in. thick and submerged welded. The finished band was only ⅛ in. thick except where the integral lugs were left at each end. This method of production was used because the ears take a heavy thrust when the brake is applied. It was considered essential that the ears be made integrally until some method of attaching them with absolute security to a separately made band could be developed.

It was always recognized that cutting the band from such thick stock was expensive and wasteful of steel milled into chips. But this method was used pending development of one less costly and yet completely reliable. A new method has now been developed and is in use at the transmission plant of Buick.

Pieces Are Preformed

Production now starts with cold-rolled high-strength steel, 0.128 ± 0.002 in. thick and 1 25/32 in. wide. This stock is received in 8 to 12-ft lengths and is cold sawed into 19⅜-in. lengths. Stock is then production punched, one end at a time, to prepare each end for welding. Then each piece is preformed on each end in a press to give the ends proper curvature for rolling into circular bands.

A single lug to form ears on each end of the band is made from cold-drawn SAE 1030 steel 11/32 in. thick and 1 25/32 in. wide. This stock is cut into 2¾-in. lengths on a cut-off machine and each lug is then struck in a die to form it to the same radius as the OD of the band. Before assembly to the band, the inner face of the formed lug is painted with a thin film of brazing paste or flux.

Tacked With Projection Welds

A lug and a band are then clamped by shoes over a mandrel, forming part of a welding fixture on a projection welding machine, shown in Fig. 2. The lug is welded to the band with eight projection welds. In the fixture, the lug is centered over the gap in the rolled ring and remains as one piece until severed after all other operations on the band are completed. A copper alloy insert is used as a backing in the arbor below the welds and the shoes clamp the band so that its ends butt. The upper shoe fits the lug and has an alloy copper facing in contact with the lug.

Welding is so done that the gap around welds between the lug and band does not exceed 0.005 in. After this welding, a small stamped copper clip is placed at the joint, being clipped over the lug to make the assembly ready for brazing.

Fifteen assemblies are placed on each Nichrome tray that enters the brazing furnace. The furnace is a pusher type and is equipped with a generator that supplies an endothermic atmosphere containing approximately 40 pct

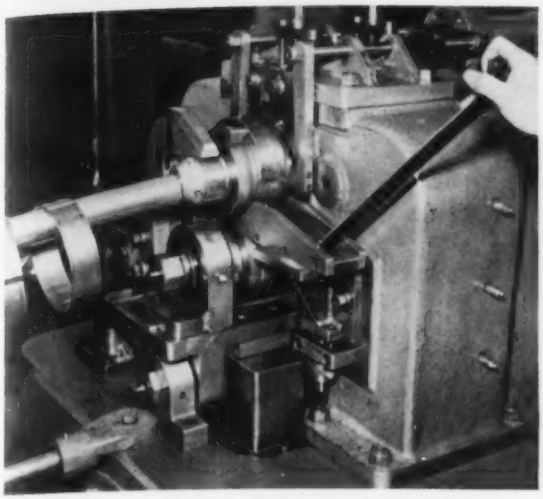


FIG. 1—Brake band blanks, with ends punched and preformed, are transformed into rings by this set of Tishken rolls.

Automatic transmission brake bands used to be machined from thick stock to leave lugs at each end. Now lugs are separate, attached by projection welding, then brazing. Steel required was formerly 5½ lb per brake; now it's 2½ lb.

H_2, 20 pct CO, with the remainder N_2. This atmosphere prevents scaling and minimizes decarburization of the steel.

In the furnace, the assemblies remain 15 min at a brazing temperature of 2030°F, then pass through a 30-ft cooling zone before emerging slightly above room temperature.

The brazed bands are belt sanded and machined to remove excess copper remaining outside the joints. Then the bands are run through a double-disk grinder that removes about 0.015 in. of metal from each edge of each band. Bands continue through a wire brush machine that removes burrs produced in the grinding.

Grit Blasting Causes Springiness

Next, bands go to a swaging press equipped with a segmental die having a tapered pin in the central hole. In this die, when the pin bottoms, the band is expanded 0.050 in. to give it a 6.094 in. OD. Then bands are transferred to a broach which produces radiused undercuts at the two ends of the lug. These cuts provide the seats for struts, applied at assembly of the transmission, for closing the band around the drum when braking is required.

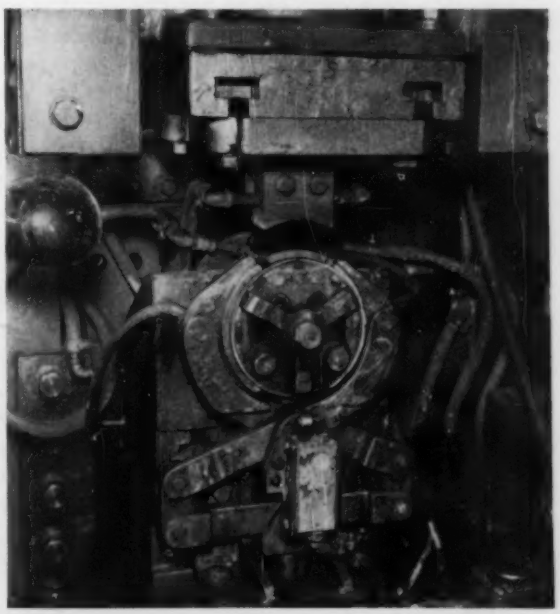
After broaching and washing, the bands are passed through a Wheelabrator that grit-blasts the inner face. The blasting not only prepares the surface for cementing the lining, but puts the inner face under compression that tends to make the band expand. After the lug is cut apart, the compression causes the ends of the band to spread when the band is free. This keeps the band lining out of contact with the drum when assembled in the transmission except when the struts force the band to contract and act as a brake in service.

Band lining is produced in flat molded strips of band width, 0.045 in. thick. Strips are sprayed with phenolic cement on one face and the cement is dried before the lining is rolled into a ring and placed inside the band in a special fixture. The space between the ends of the lining is centered opposite the line where the ends of the band meet.

In the fixture, the lining is pressed against the inner face of the rings under a radial pressure of 225 psi. The faces of segments that apply this pressure are resistance heated to 400°F and each lining is clamped for 6 min. The heat fluxes and cures the phenolic resin cement, producing a permanent joint between the band and its lining.

When the assemblies are removed and cool, any protruding edges of the lining are sanded flush with the metal of the band. Then the lining is ready to be bored and circumferentially

FIG. 2—Setup in a Federal welder for projection welding a lug to the ends of the brake band ring. The lug is later severed to leave an ear on each end of the band ring.



grooved. This is done in setups in two-spindle boring machines.

After this boring, which holds an ID of 6.019-6.024 in., a set of carbide tools moves out radially to cut the circumferential oil grooves in the lining. Finally, the band is severed across the center of the lug, leaving an ear on each side. The cut is made on a milling machine, and burrs left in the cut are then removed by an abrasive belt and file. After passing inspection, bands are ready for assembly into the transmission.

It is expected that the new method will reduce the cost of bands to about one-third that involved in the prior method. A part of this saving is in steel required per band. This is reduced from over 5½ lb to less than 2 lb per band because loss in chips in the new method is much less than by previous methods.

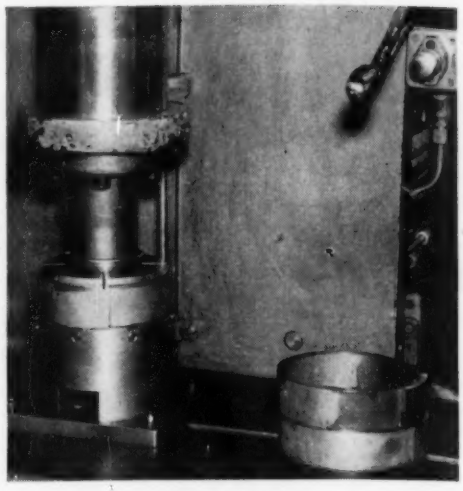


FIG. 3—The segmental die in this press is used to expand each brake band ring to bring the ID to final size.

NEW BOOKS

Current releases from the publishers that will be of interest to management, sales, engineering and production personnel in the metalworking industry.

"Engineering Economy," by H. G. Thuesen. Pointing out that engineering is essentially a means of obtaining desired results with economy, the book purposes to aid the engineering student to extend to economy the application of factual analyses in which he is proficient, and to develop an attitude that will cause him to approach engineering problems with regard for their economic as well as their physical implications. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. $6.65. 502 p.

* * *

"Sales Engineering," by B. Lester. This second edition is concerned with the art of selling equipment and services that require engineering skill in their selection, application and use. The book describes the type of work this involves, the opportunities it offers for a career, and the skills and techniques that have been found successful in over 35 years of selling machinery and technical products to industry. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $3.00. 226 p.

"The Growth and Development of Executives," by M. L. Mace. The author presents the results of his observations on the manner in which numerous industrial firms are undertaking to develop executive talent. The central theme of the book is the coaching concept, and his main conclusion is that the most effective way of providing for the growth and development of people is through the conscious coaching of subordinates by their immediate superiors. Harvard Business School, Div. of Research, Soldiers Field, Boston 63. $3.25. 200 p.

* * *

"Lower Prices Coming!" W. J. Baxter describes the shape of things to come, telling that present-day dollars will soon buy more of everything at lower prices. Containing explanatory cartoons by Rob't Day, the book predicts that one-third of the nation's four million business firms will either be eliminated or pass into stronger hands in the buyer's market that is ahead. International Economic Research Bureau, 76 William St., New York 5. $1.00. 92 p.

Germans Make Pig Iron Without Coking Coal

Using briquettes made of non-coking coal and ore fines, the low-shaft distillation furnace is in continuous production. The new furnace is only one third the size of conventional blast furnaces, yet tonnages of iron from both units are equal.

By B. M. PEARSON, *Saxonhurst, England*

WITH the Humboldt distillation process, pig iron is produced in a low-shaft blast furnace. Ore fines and a noncoking coal are used in the form of briquettes. Noncoking coals rich in gas and tar are most suitable.

The process was first developed during the war by L. Weber in conjunction with the Kloeckner-Humboldt-Deutz concern in Germany on the conception of using ore-coal briquettes in a low-shaft blast furnace. The briquettes were first given a low-temperature distillation in a Kloeckner-Humboldt-Deutz carbonization oven and then processed in the low-shaft blast furnace. However, after the preliminary development work, the Kloeckner-Humboldt-Deutz concern decided to combine coking with the reduction in the blast furnace. By doing the low-temperature carbonization part of the work in the upper part of the shaft and utilizing the heat of the throat gas, the process became simpler and more commercial.

The low-shaft blast furnace has a long, rectangular or round cross-section. The height of the shaft from the hearth amounts to about 13 to 17 ft. The low-temperature carbonization takes place more or less in the same manner as in the Germal Spuelgas low-temperature carbonization processes, while in the middle and lower part of the shaft, the reduction and melting takes place.

Ore and other constituents and the coal are combined in the briquette. Both—the ore constituents as well as the coal—are finely crushed. After the carbonization, when the charge has progressed down the shaft, a sufficiently mechanically strong ore-coke briquette is formed. Because of the highly favorable surface properties, the material is particularly favorable to the reduction reactions and by virtue of the good degree of distribution of the ore and coke, excellent heat transfer conditions are obtained in the shaft. A specific temperature drop is caused as a result of these factors, which makes possible conducting these two separate processes in the shaft without oxygen enrichment of the blast.

Coal Tar Recovered

Throat gases leave the furnace at temperatures which are only slightly higher than the normal blast furnace throat gas temperatures. The carbonization products from the coal are contained in the gas as low-temperature distillation vapors and gas. The calorific value of this low-temperature distillation throat gas at 1400 to 1450 kg-cal is considerably higher than with normal throat gas. After dust cleaning, the hydrocarbons are removed from the throat gas in a condenser plant. The thick tar which is recovered here is used as a binding agent in the briquetting process. It can, however, be partly or completely replaced by lime or the clay portion of the burden.

The charging of the burden into the blast furnace is not conducted batchwise as normally, but continuously. The regulation and control of the furnace and melting process takes place similarly as with the blast furnace, by variation in

the blast volume and in the blast temperature or by altering the burden or fuel charging. As the throughput time only amounts to 1½ to 2 hr, even after a very short period, a change in the burden is shown in the melting results. The small capacity of the low-shaft blast furnace makes possible a daily production per cubic meter of internal furnace volume of about 3.5 tons. This is 2½ times as much as the best Swedish output at Domnarfvet.

In 1949, on the basis of results obtained with a semi-large scale plant, the Kloeckner-Humboldt-Deutz concern proceeded with the construction of a further experimental low-shaft blast furnace. This furnace is provided with a complete condenser layout for recovery of the valuable distillates from the throat gas. A recuperator, which is operated with the furnace gas, serves for preheating the blast wind and the iron is run into a small casting bed.

The metallurgical and technical operational results have fulfilled expectations. Burnt pyrites residue and bauxite iron mud were smelted in the above manner in this furnace with an unwashed gas coal whose ash content amounted to 15 pct. The object of the test run was to smelt and produce a commercially usable pig iron.

Standard Burden Used

The charging of the furnace (ore and fuel) was not altered during the test run. In the second half of the test, because of the small manganese content of the burden, a manganese addition in the form of a high-content manganese slag was added. The lime-silica ratio amounted on the average to 1.5. Over 30 castings of this product were investigated. The pig iron produced had the following average composition: 3.3 pct C; 2.8 pct Si; 0.2 to 1.8 pct Mn and 0.03 pct S. The composition of the slag was 44.3 pct CaO; 29.3 pct SiO_2; 18.5 pct Al_2O_3; 2.4 pct MgO and 2.5 pct S. The furnace was run hot by means of a generously proportioned fuel addition. The iron was produced as a gray, fine grained iron.

In order to follow more closely the degree of reduction, the characteristics $K_{Si\ S}$ and $K_{Mn\ Si}$ were calculated for all the iron test pieces, in relation to the lime-silica ratio of the slag and developed into "standard" curves according to T. Kootz and W. Oelsen.

The carbon content varied between 3.1 and 3.5 pct. The reason that the carbon content was not higher in spite of the high fuel charge and the basic slag may well be ascribed to the very small furnace unit and to the low-blast preheating by means of the recuperator. In this connection, mention may be made of the method of operation of the small Siegerlaender "cold blast" blast furnace, in which the smaller furnace unit, with lower air-preheating, showed a corresponding smaller carbon content in the iron. More detailed and also broader conclusions from the test results of this very comprehensive development work are not yet available. Also, here, only broad reference can be made to the wide field on which research has been conducted of the ore-coal briquetting, the low-temperature carbonization and the condensation of the low-temperature distillates which are all closely associated in the low-temperature carbonization-smelting process.

New Process Much Cheaper

Comparisons made of the costs of iron production in a low-temperature carbonization blast furnace plant for producing pig iron with iron production costs in a normal blast furnace plant, which has to operate with a high proportion of sinter material in the burden, show the former method is cheaper. This is substantiated even if the iron production costs are calculated for the low-temperature carbonization blast furnace process and compared with the production cost of the iron from a normal blast furnace, if both were operating on the same burden.

The capital installation costs of a low-temperature carbonization blast furnace plant will obviously be lower than with a normal blast furnace plant, because of the considerably smaller furnace volume required per unit of production, by the smaller blast requirement and the abolition of a coking plant. Of this latter unit, only the by-product condenser unit is required for the low-shaft blast furnace. The ore-sinter unit is replaced by the briquetting layout.

A cost analysis in the normal sense, loses its significance, if a broader view is taken in those countries where coking coals are not available and where only fine ore deposits are available. Such countries could develop and build up an iron industry with this process in an economical manner.

But also even in those countries possessing reserves of coking coals, the use of commercial noncoking coals has special technical significance if it be considered that these coals, which are more easily mined, can now be used in conjunction with a by-product recovery process. The by-products in addition appear on the credit side of the production sheet balance.

Cheap Ore Fines Available

Finally, attention should be drawn to the large reserves of ore fines deposits existing in the world and to the extensive amounts of "artificial" iron ores available, such as scale, pickling waste, etc., which can be worked up cheaply and in a satisfactory manner by this new smelting process. The process is still of course in the development stage. Technicians and research workers of the German and foreign iron producing countries are extremely interested in the possibilities presented.

news of industry

Scrap Men Watch and Wait for ESA Price Ceilings

Rumors are rampant . . . The industry airs its views in Washington, final meeting on Jan. 11 . . . New schedule of $1.50 deducted from formula is strong rumor—*By Bill Lloyd.*

Cleveland—Rumors were more numerous than No. 1 bundles in major scrap centers this week as the trade awaited an announcement by Economic Stabilization Agency of new ceiling prices and regulations on scrap.

Industry representatives attending conferences in Washington last week presented their views on the differentials the trade considers necessary for ceilings on steel and railroad scrap.

They are expected to complete their "suggestion" meeting Jan. 11, offering proposed differentials on cast and foundry grades of scrap on that date.

May Include Differentials

ESA officials take the view that the government alone will take the initiative in establishing maximum base prices—when the time comes—but industry proposals for establishing differentials as to base points and grades may well be incorporated in the forthcoming regulation as submitted.

About 15 representatives of the scrap, steel and railroad industries together with government officials attended last week's 2-day "suggestion meeting."

Basically, current government thinking is geared to the idea of bringing up to date the former OPA Reg. 4 applying to scrap prices at the close of World War II.

In the wake of the meeting, the scrap market is on edge, waiting. Mills and foundries need tonnage. Shipments generally are poor. Foundries report they can't buy tonnage at a lower price despite the fact that the trade seems reconciled to a big price cut in the cast grades.

Rule of Thumb

Out of the maze of conflicting reports and rumors it would appear that a rule of thumb for figuring out the new price schedule could be—deduct $1.50 from the formula prices on openhearth, low phos and blast furnace grades.

In any event, the new price schedule will probably look something like this. Readers are warned the following prices are not official.

In Pittsburgh, Sharon, Warren and Youngstown, No. 1 heavy melting steel will be pegged at $45 per gross ton delivered, including brokerage.

Expected Prices

Other primary grades are expected to fall in line about as follows:

No. 2 heavy melting steel, $43; No. 2 bundles, $42; low phos, 5 ft, $47.50; railroad heavy melting No. 1, $46; rails, random, $47; rails, 3 ft and under, $50; rails, 18 in. and under, $53; rerolling,

Turn Page

NPA Limits Scrap Stocks

Washington — To maintain movement of scrap steel to mills, NPA issued order M-20, limiting inventories of regular dealers, brokers, auto wreckers, and any scrap producer to a 60-day or working level, whichever is least. Exempt are shipbreakers, and similar long-term operators, as well as those in seasonal operations for later shipment by water.

Seeks New England Gas Line OK

Washington—Northeastern Gas Transmission Co. has asked permission from the Federal Power Commission to extend a proposed New England line by 441 miles through Massachusetts, New Hampshire and Maine. Estimated cost of the line is $14 million.

DO Powers Delegated to CAA

Washington—The National Production Authority has delegated defense rating authority to the Civil Aeronautics Administration in order to assure steel, aluminum and other materials and equipment for the Civil Air Transport and the Federal Airways System.

DO Authority for Overseas Work

Washington—Authority to issue DO ratings for construction equipment needed for overseas projects has been granted to the Defense Dept. by the National Production Authority through amendment to Delegation 1, effective Dec. 29.

INDUSTRIAL SHORTS

SMALL MOTORS PLANT—A new small motors plant will be built in Union City, Ind., by WESTINGHOUSE ELECTRIC CORP. Production is scheduled to start in late 1951 and the plant will employ about 500 people at full operation.

MORE RIVETS — The Cherry Rivet Co., Los Angeles, has merged with the TOWNSEND CO., New Brighton, Pa., manufacturers of rivets. The Cherry Rivet Co. will operate as the Cherry Div. of Townsend with William B. Hubbard, former president of Cherry, as managing director.

OPEN HOUSE—An open house held last week by DEARBORN MOTORS CORP., opened their new three-story office building, agricultural research center and warehouse at 2500 East Maple Road, Birmingham, Mich.

ADDS LINE—The Delta Star Electric Co., Chicago, manufacturers of high voltage electrical equipment, has been acquired by the H. K. PORTER CO., INC., Pittsburgh. No change in the operation or management of Delta is contemplated.

CANADIAN OUTLET — The RELIANCE ELECTRIC & ENGINEERING (CANADA) LTD., Welland, Ont. has been established as successor to the Commonwealth Electric Corp., Ltd., The Commonwealth company which manufactures alternating current motors and transformers was acquired by the Reliance Electric & Engineering Co., Cleveland, last year.

SOUTHERN REP—The American Flexible Coupling Co., Erie, Pa., manufacturers of American flexible couplings and Amerigear couplings for power transmission, has appointed the H. H. KUMLER CO. of Houston and Tulsa, as representative in Texas and Oklahoma.

TESTER AGENT—The Ernst portable hardness tester made by Snow, Deakin & Co., Ltd., England, has named FRANK W. FAERY CO., Detroit, as sole agent for this item in Michigan as well as Toledo.

AEC PROJECT — Donald W. Neville, vice-president of F. H. McGRAW & CO., New York, will head up the company's new $350 million construction project for the Atomic Energy Commission at Paducah, Ky. The company states that the project involves the largest single construction contract ever awarded to a construction company. It will require nearly 10,000 men and will take more than 2 years to complete.

SOUTH AFRICAN PLANT—A plant near Johannesburg, South Africa, has been purchased by LINK-BELT AFRICA, LTD., to manufacture conveyer machinery and other Link-Belt products. John E. Petersen, formerly divisional engineer at the Chicago plant of the Link-Belt Co., has been appointed managing director of the South African company.

EXPANDING—The CONSOLIDATED IRON-STEEL MFG. CO. has purchased the Chicago Pneumatic Tool Co.'s former plant in Cleveland. This acquisition was for the expansion of their Republic Structural Iron Works, for its steel warehouse and heavy steel fabrication business.

LARGER QUARTERS — FOLLANSBEE STEEL CORP. will quadruple its warehouse space in Pittsburgh with acquisition of a building occupied until recently by the Dilworth Porter Div. of Republic Steel Corp.

DISTRIBUTOR—Trabon Engineering Corp., Cleveland, has appointed the RITTER ENGINEERING CO., Pittsburgh, as exclusive distributor in the Pittsburgh district for their centralized lubrication systems.

$52; specialties, $50; No. 1 cast, $50; machine shop turnings, $35; shoveling turnings, $39; structurals, 3 ft, $48; structurals, 2 ft, $50; structurals, 1 ft, $51.

In Chicago, Philadelphia, Cincinnati and Buffalo the price of No. 1 heavy melting steel will probably be $1 or so under the $45 Pittsburgh price. Base price differentials, similar to those of the late formula, will apply. For example, price of No. 1 heavy in Cleveland will probably be $44.

If the foregoing prices prove to be official, it appears that an umbrella has been put over the crushers, in the form of a $4 premium for shovelings. Under the formula, this premium was $2.

It is believed the new price schedules will be announced about Jan. 15, or as soon after the Jan. 11 meeting as possible, and will become effective Feb. 1. This will give mills and shippers about 2 weeks to clean up hold orders.

Old orders still outstanding by Feb. 1 may be canceled, it is possible.

Expect Inventory Controls

It is expected inventory controls will be included in the new regulations. Also, it has been recommended (by foundries) that mills not be permitted to buy electric furnace tonnage unless they have electric furnace capacity, or in fact, any foundry grade of scrap.

Still in doubt is the brokers' commission. Brokers want a dollar, but it is believed that brokerage will be 75¢.

Points like Kansas City and Houston may be included in the new base schedule.

Allocation regulations are also expected to be a part of the new regulations. It is generally recognized that allocations are an essential part of scrap price control—that they will apply only when a consumer is in trouble.

Demand for scrap, with or without price control, will probably reach a new high this year. There is serious doubt that supply will be adequate.

Tin Restriction Hastens Hot Dip Method End

Was dying slow death anyway . . . February order limiting use of tin renews interest of canmakers in 1.00 lb unenameled electrolytic tinplate . . . May sacrifice speed for defense.

Pittsburgh—The need for conservation of tin will hasten the demise of the hot dip method of producing tinplate, which was dying a slow death anyway.

A government order restricting use of tin for civilian purposes beginning next month (THE IRON AGE, Dec. 28, '50, p. 81) renewed interest of can makers in a 1.00 lb unenameled electrolytic tinplate as a substitute for 1.25 and 1.50 lb hot dip.

Look for It in '51

On the basis of fairly large-scale tests, some of the major can companies are seriously interested.

However, on most electrolytic lines this heavier grade is produced only at considerable penalty in speed of the line. Nevertheless, it was believed that certain equipment may be available to produce the heavier coating weights, which could possibly include some intermediate coating weights between the present maximum of at least .75 and 1.00. Thus, mills, of course, will do everything within reason in the interest of national defense.

Production of hot dip tinplate in relation to electrolytic has been declining steadily in recent years. In the first 9 months of 1950 the product mix was 54.0 electrolytic, 36.1 hot dip, 9.9 black plate. This compares with 52.0 for hot dip and 24.0 for electrolytic in 1946. In 1949 the percentages were 48.0 electrolytic, 41.0 hot dip.

Tin Conservation Factor

This trend had been expected to continue at about the same pace, but the tin conservation program will speed it up. It would not be surprising if some present hot dip producers tried to abandon this product for all practical purposes.

On the basis of production in the first 9 months of 1950, shipments for the year were probably between 112 and 114 million base boxes. If tin is available, the industry probably will produce between 119 and 120 million base boxes this year. New electrolytic lines will be coming into production in the last half of '51.

East Germany Plans Steelworks

Berlin — Red-dominated East Germany will build a new State steel works at Leipzig, on the site of the former Hasag armament plant. Operation is scheduled for the third quarter this year. Also planned is a new steel foundry at Mettallgusswerk, in Leipzig, and expansion of Electrostahlgusswerk's cast steel production by 30 pct. The Brandenburg steel plant is operating a fourth new openhearth furnace.

Open New Scrap Metals Yard

New Haven, Conn. — Starting operations on Jan. 2, Eastcoast Scrap Iron and Steel Co., Inc., a subsidiary of Schiavone-Bonomo Corp., Jersey City, has been established at 299 Chapel St., here.

It is handling all grades of scrap iron, steel, and metals and has a large Galland-Henning hydraulic press for all grades of baling materials, shears, truck and travelling cranes. The yard is located on water for barge shipments and has a railroad siding.

Ask Data on Barium Products

Washington — The barium carbonate industry has been asked for data to assist in drawing up an allocation order which will assure an adequate supply for radar and other defense products and equalize the supply for non-defense. The proposed order will also affect distribution of barium chloride for steelmaking and manufacture of magnesium.

May Develop Iron Ore Land

Washington — Public domain lands in Minnesota may now be prospected and developed for mining of iron ore under new regulations approved by the Dept. of Interior. The regulations governing leases and permits from Interior's Bureau of Land Management are similar to those provided under general mining laws for leasing of minerals on acquired lands.

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Jan. 8, 1951

Item	Quantity	Value	Company
Recorder-reproducer	300	$ 150,000	Sound, Inc., Chicago
Washing machines..	33	123,295	Chicago Dryer Co., Chicago
Test sets.....	460	1,000,000	General Communications Co., Boston
Automatic pilot.....	27	273,000	Sperry Gyroscope Co., Great Neck, N. Y.
Tubes, electron.....	8000	270,400	Amperex Electronic Corp., Brooklyn, N. Y.
Tubes, electron.....	43,000	810,988	General Electric Co., Schenectady
Tubes, electron.....	50,000	862,500	General Electric Co., Schenectady
Drill, pneumatic....	.....	138,020	Aro Equipment Corp., Bryan, Ohio
Drill, pneumatic....	.....	90,000	Air Speed Tool Co., Los Angeles
Air welders.....	.....	91,000	General Electric Co., Dayton
Airplane kits.....	.....	100,000	North American Aviation, Los Angeles
Receiver-transmitter	.....	2,761,725	Hoffman Radio Corp., Los Angeles
Aircraft kits.....	.....	100,000	Fairchild Aircraft & Engine Corp., Hagerstown, Md.
Kits	.....	264,105	Denison Engineering Co., Columbus
Block assy.	.....	224,787	New York Air Brake Co., New York
Aircraft heater assy.	.....	99,347	Surface Combustion Corp., Toledo
Valves, hydraulic...	.....	235,748	Saval Div. of Wm. R. Whittaker Co., Los Angeles
Parts, telescope.....	.....	1,140,000	Gilbert & Barker Mfg. Co., West Springfield, Mass.
Parts, telescope.....	.....	404,800	Universal Camera Corp., New York
Sight unit, M-34....	.....	550,165	The Auto-Soler Co., Atlanta
Fuel, water pump parts	.....	96,872	Borg-Warner Corp., Bedford, Ohio

National's Eastern Mill Rivals U. S. Steel's

Will have about 1¾ million ton capacity . . . About equal to U. S. Steel mill nearby . . . Both mills will probably expand later . . . Bethlehem advantage seen cut—*By John Delaney.*

Pittsburgh — National Steel Corp.'s new eastern mill near Camden, N. J., will have an initial annual ingot capacity of approximately 1¾ million tons. Thus it will compare in size with the mill U. S. Steel Corp. is building at Morrisville, Pa.

The new National plant will be situated on a rectangular 2000-acre plot on the Delaware River at Paulsboro, ten miles south of Camden and opposite the Philadelphia Southwest Airport. This is about 35 miles downriver from the site of the new U. S. Steel plant. It is considered likely that National will set up a new subsidiary to operate the eastern mill.

Expansion Likely Later

These two mills are likely to be expanded in size later. Initial capacity of the U. S. Steel plant will be 1,800,000 ingot tons, but eventually this may be lifted much higher—when ore is available—provided demand warrants it.

National Steel will invest approximately $400 million in its eastern operation. As a contribution to the defense effort, part or all of this cost will be covered by a Certificate of Necessity permitting amortization over 5 years.

The plant will include at least two blast furnaces, openhearths, slabbing-blooming mill, hot strip mill, sheet mill, an electrolytic tinplate line, an electro galvanizing line, by-product coke ovens, annealing equipment, and other integrated mill operations.

Ore for the blast furnaces will come by ocean-going carriers from the new Labrador-Quebec iron ore fields. This ore is perhaps 3 years away, but the mill will be turning out steel before that. The company will have finishing mills in operation meanwhile.

Ernest T. Weir, chairman of National, said the new plant will provide "substantial" tonnages of steel for an expansion of domestic and foreign business. National's chief export trade product is tinplate.

The National and U. S. Steel mills will drastically alter the competitive picture in the East, where Bethlehem Steel heretofore has enjoyed an advantage. National also will be in a better position to market its products in the West.

No date has been set for start of construction of National's mill. U. S. Steel Corp. plans to break ground in about 2 months.

Present ingot capacity of National is 4,500,000 tons, but expansion plans exclusive of the new mill will boost this to 5,500,000 tons early next year. An additional 1,750,000 tons in the new plant would bring the total to 7,250,000 tons. This would make National the nation's fourth largest producer.

Few Midwest Suppliers Heed Rollback Order

Very few have rolled back prices to Dec. 1 levels . . . Determining validity of hikes would mean wide investigation . . . Suppliers seek raw material rollbacks—*By Gene Beaudet.*

Chicago—A check of manufacturers in the Chicago industrial area reveals that very few of their suppliers have rolled back their prices to Dec. 1 levels in response to the government's request to do so. Either their price increases were justified in accordance with the ESA's voluntary rollback order or they are just ignoring it.

To determine whether these increases are allowable under the present pricing standards would necessitate investigating a great number of companies supplying thousands of products to the metalworking industry. The rollback order will remain ineffective until some teeth are put into it.

"New machine—we're waiting for somebody to tell us how it works."

Some Rescind Rises

Although some manufacturers of finished products in the area have rescinded price increases put into effect after Dec. 1, they did so without knowing definitely whether they were required to do so in the face of rising labor and material costs.

When the rollback order was announced on Dec. 19, a great many suppliers had already increased their prices during the first half of the month. Price boosts ranged from 5 to 10 pct on a variety of products from paper bags to heavy chemicals and from fasteners to forgings.

Some believe the order was issued not so much to effect a price rollback as to put a damper on future price increases. Suppliers who have increased prices after Dec. 1 claim they cannot restore former prices unless those of raw materials are also restored. When

they can be assured a steady flow of materials at prices which will enable them to sell at Dec. 1 prices they will roll back their own, they say. Also, in this seller's paradise no one is going to lower his prices if his competitor isn't going to do the same.

Just Following Trend

Many of the suppliers hitched their price increase to the recent hike in steel prices and the rising cost of nonferrous metals. Unless these come down they will not budge. Since the government does not wish to jeopardize the wage gains which accompanied the steel price rise, steel prices probably won't be altered with the result that nothing will be done about other price increases that followed them. Furthermore, both suppliers and manufacturers of finished products claim their prices have not kept abreast of material and labor costs since the Korean War started and that any price increases since then only partly make up for them.

The following are a few of the products supplied manufacturers whose prices have jumped since Dec. 1 and have not yet been rescinded: foundry products, forgings, fasteners, electric motors and controls, ball bearings, gasoline engines, locomotive specialties, air brakes, coil springs, pipe fittings, hose, rubber tubing, soda ash, acetic acid, lubricating oils, paper bags, and insulation materials.

Buyers Are Hard-Pressed

Among the few items whose price increases were rescinded were air filters and small tools such as diamond and abrasive wheels.

Meanwhile, industrial buyers are harder pressed than ever to keep their plants adequately supplied with the many items going into their companies' finished products. Deliveries are becoming slower and more uncertain. Forward buying, which has become more and more extended since the Korean War started, has gone out as far as practicable since the government is likely to step in at any time and restrict supplies.

At the beginning of December, several large companies in the area which were buying 3 months in advance at the start of the Korean War, stepped up their forward buying from 5 to 6 months.

Local Market Mill to Be Built in Tennessee

Is new entry into future race for steel markets . . . Use local scrap, serve local market . . . Plan two electric furnaces . . . Mill will have freight umbrella protection—*By Bill Packard.*

Nashville, Tenn. — Tennessee Steel Corp. has just been incorporated in Nashville to build an electric furnace mill in the vicinity of Oneida, Scott County, Tenn. This marks a new entry in the future race for steel markets. A small, low-cost mill, designed to serve a local market, will consume local scrap and sell its products in a protected market.

Heart of the new plant will be two 25-ton top-charge electric furnaces and one smaller unit. Finishing facilities will include a rod mill and strip mill. Annual capacity is rated at 100,000 tons, not counting a rail rerolling and slitting mill of 36,000 tons capacity.

Wire Mill Possibility

Finished products will include bar shapes and sections, household and agricultural pipe, hot-rolled strip, merchant and reinforcing bars, mine rails, cross ties, mine and fence posts. A wire mill is among future possibilities.

Total cost of the mill is expected to be only about $5 million to $6 million, or about $50 per ton of capacity. Completely integrated new steel capacity has been estimated by various industry sources to cost as much as $200 to $300 a ton.

Financing is expected to be at least 80 pct private; there is a possibility that an RFC loan covering up to 20 pct of the cost will be sought. An application for a Certificate of Necessity is now being prepared. If approved, it will provide tax benefits in the form of 5-year amortization of the facilities.

Freight Umbrella Protection

The new mill will be designed to meet growing steel needs of industries in Tennessee, the Carolinas and adjoining states. Backers of the mill say they will aim at the local market by concentrating on prompt delivery, competitive prices, and production tailored to meet customers' special requirements.

Actually, the mill is being located in a market that will have the protection of a freight umbrella. The freight advantage results from the shift from basing point to f.o.b. method of selling steel. The competitive freight advantage will be equal to the difference in freight rates between this and other producing points to consumers in this area.

A leading figure in the new corporation is Dr. Huston St. Clair, several large companies in the

Answer to High Rail Rates

New York—One answer to today's high freight rates is the erection of small steel plants in areas now remote from mills.

Under proper conditions electric furnaces, making carbon bar and flat-rolled products plus fast continuous mills permit steel costs as low as those of large integrated plants.

Under f.o.b. mill pricing such plants could sell their products in a market protected by a freight umbrella.

For a complete technical discussion of this type mill see The Iron Age, **Apr. 6, 1950, p. 90.**

of Tazewell, Va., an industrialist whose other interests include Jewell Ridge Coal Corp. and Virginia Smokeless Coal Co. Some years ago the St. Clair group acquired control of the Oneida & Western Railroad. Very low cost power is available from nearby Tennessee Valley Authority.

Piper Engineering Co. of Pittsburgh in association with Warren Worthington are preparing plant layouts and recommending equipment for the mill.

Harrison Heads DPA as Straw Boss to Wilson

Truman forms new Defense Production Administration to carry out policies of Wilson's ODM . . . Forms board to advise Wilson . . . Present agencies hold only administrative powers.

Washington—President Truman last week by executive order created a new agency, the Defense Production Administration, for the purpose of consolidating and speeding production and other mobilization efforts.

The new agency will be headed by William H. Harrison, erstwhile head of the National Production Authority. He thus becomes second in command to Mobilization Director Charles E. Wilson and the straw boss for carrying out policies and directives of Wilson's office.

Board to Advise Wilson

At the same time, the order also created a Defense Mobilization Board to assist and advise Wilson in all his major jobs—production, transportation, manpower, economic stabilization, and foreign aid. In addition to Wilson as chairman, the DMB will be comprised of the secretaries of Agriculture, Commerce, Defense, Interior, Labor, Treasury, and the chairmen of the Board of Governors of the Federal Reserve Board, Reconstruction Finance Corp., and National Security Resources Board.

"The Office of Defense Mobilization will determine general policies very much like the Office of War Mobilization did in World War II," Mr. Wilson said, "and the DPA will have about the same powers as the former WPB."

However, while WPB did both programming and operating in its own right, the new DPA will do the programming and leave the actual administration in the hands of the present operating agencies.

For instance, NPA currently remains as part of the Commerce Dept. but under a new chief, scheduled to be Manly Fleischman, erstwhile general counsel to the agency, but under the control of DPA, which assumes the authority for priorities, allocations and so on. The NPA will continue to issue orders but only after approval by Gen. Harrison as DPA head.

Likewise, most of the authority or power over production loans, procurement, certification of expansion plans for fast tax write-offs, etc.—previously held by other agencies—have also been moved over to the new DPA.

Insofar as military procurement is concerned, however, neither the ODM nor the DPA will have anything to do with the actual placing of orders. But both Wilson and Harrison can prod defense buying or report back to the White House if they think military purchasing is hitting the economy too hard.

"Fix me up an ironclad contract I can wiggle out of if I want to."

With respect to food, the DPA can order diversion of agricultural products to industrial programs, such as grain for making industrial alcohol. But authority over all other food programs, including food for human and animal consumption, and domestic distribution of farm equipment and commercial fertilizer, remains within the control of the Agriculture Dept.

NSRB Stripped of Powers

The NSRB is stripped of much of its policy-making powers but it still will report directly to the White House on certain planning matters. As for operational matters, the chairman now merely becomes just a member of the advisory DMB.

The new DPA will also have overall direction and control over defense production and mobilization activities within other departments and agencies than those previously mentioned. These include:

Defense Transport Administration (domestic surface transport, storage, and port facilities); Commerce Dept. (air, coastwise, intercoastal, and overseas shipping) and the Interior Dept. (petroleum, solid fuels, minerals and metals, and power).

Cooperation with DPA

The Labor Dept. will work out labor and manpower problems and programs in cooperation with the DPA where defense and essential civilian production is concerned.

The Economic Stabilization Agency will work in cooperation with but independently of the DPA, going directly to Wilson, in working out its price-wage programs and controls.

DEFENSE MOBILIZATION ORGANIZATION

THE PRESIDENT

EXECUTIVE OFFICE OF THE PRESIDENT
- National Security Resources Board
- National Security Council
- Council of Economic Advisors
- Bureau of the Budget

OFFICE OF DEFENSE MOBILIZATION
- Director

DEFENSE MOBILIZATION BOARD
- Director of ODM, Chairman,
- Secretaries of Treasury, Defense, Commerce, Interior, Agriculture, and Labor, and Chairmen of RFC, NSRB, and the Board of Governors of the Federal Reserve System


Harry S. Truman


Charles E. Wilson
ODM


W. H. Harrison
DPA


Alan Valentine
ESA


Stuart Symington
NSRB

DEFENSE PRODUCTION ADMINISTRATION
- Administrator
- Production Executive Committee
  - Establishes overall production priorities
  - Determines program feasibility
  - Sets production program goals
  - Determine scope of production expansion
  - Estimates labor supply requirements for production programs
  - Represents U.S. on combined boards
  - Secures production plans from all agencies and develops methods and procedures for their execution
- Requirements and Allocations Advisory Committee

ECONOMIC STABILIZATION AGENCY
- Administrator
- Prices
- Wages

CREDIT CONTROLS
- Federal Reserve Board
- Housing and Home Finance Agency
- Controls consumer credit and real estate construction credit

DEPARTMENT OF DEFENSE
- Secretary
- Develops requirements for military procurement and production programs; procures military equipment; develops stockpile programs

DEFENSE TRANSPORT ADMINISTRATION
- Administrator
- Domestic surface transportation, Storage, and Port Facilities

DEPARTMENT OF COMMERCE
- Secretary
- Air transportation, Coastwise, Intercoastal, and Overseas Shipping
- Production and distribution of industrial products (except as otherwise designated)

DEPARTMENT OF INTERIOR
- Secretary
- Petroleum
- Solid Fuels
- Power
- Minerals and Metals
- Commercial Fisheries

DEPARTMENT OF AGRICULTURE
- Secretary
- Food for human and animal consumption and domestic distribution of farm equipment and commercial fertilizer
- Food for industrial use

FINANCIAL AGENTS UNDER EXECUTIVE ORDER NO.10161
- Federal Reserve Board
- Reconstruction Finance Corporation
- General Services Administration
- Make loans, act as fiscal agents, and make purchases on behalf of other agencies to promote measures for the expansion of productive capacity and supply

DEPARTMENT OF LABOR
- Secretary
- Formulates plans, programs, and policies, and utilizes the public employment services system for meeting defense and essential civilian labor requirements

PRIORITIES, ALLOCATIONS AND REQUISITIONING OPERATIONS

OTHER AGENCIES HAVING MOBILIZATION ACTIVITIES
- STATE
- HOUSING AND HOME FINANCE AGENCY
- FEDERAL SECURITY AGENCY
- ATOMIC ENERGY COMMISSION
- OTHERS

Overall direction, control, and coordination of mobilization activities

Direction and control over defense production activities

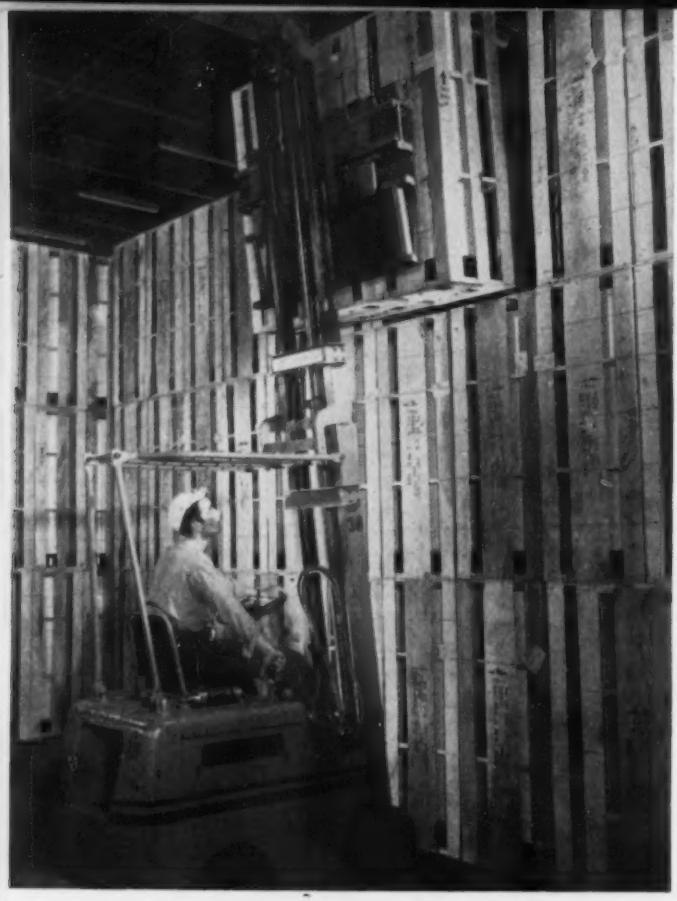
Handling Costs Cut, Pallets Eliminated by Fingerlift Truck

Milwaukee—Pallets have been outmoded and a marked reduction in material handling costs has been effected with introduction of a new crate handling method at A. O. Smith Water Heater Div., Kankakee, Ill.

Manpower savings of over 50 pct, elimination of pallets and pallet maintenance, lower lift truck maintenance, and less damage to crates and contents are claimed for the new "fingerlift" handling method developed at the Smith plant.

A 5-man team is doing the work formerly done by 22 operators, handlers and stockroom repairmen. Less waste space in warehouses with fewer aisles and additional stacking height is claimed.

Lift trucks fitted with a special fingerlift attachment eliminate the need for pallets and fork type lifting arm.



NO PALLETS: One man moves and stacks three crated water heaters in smooth operation. Formerly one man operated truck and two men stacked heaters on pallets.

FINGERS: Heart of the cost-cutting fingerlift crate handling device is row of spring actuated fingers in position to lift a crated water heater at the A. O. Smith Water Heater Div., Kankakee, Ill.

LINE TO CAR: One man driving fingerlift equipped truck moves crated heaters directly from assembly line and stacks them in boxcar.

Spring loaded fingers are mounted on a horizontal shaft. Pressure on the finger tips tilts them backwards. A vertical apron serves as a rest when the truck mast leans back. The whole assembly shifts right and left.

In operation the truck moves forward until the apron meets the crate. Some fingers protrude between the crate's vertical slats while others are pushed back. As the truck mast is raised, fingers between the slats engage a horizontal cleat or the crate top and raise the crate. The tilted fingers slide up the slats out of the way.

In a typical production line operation one man and truck place six crates on a dolly. With additional crates on the fingerlift, the truck and dolly move to the warehouse where the crates are stacked by the operator.

Formerly two men manhandled crates to dolly and truck, and two men stacked crates in the warehouse.

Two men operating fingerlift trucks between production line and boxcar can regularly load 1600 heaters into 10 cars in 7½ hours. This includes stacking in the car without use of pallets.

Arrangements for marketing the fingerlift have been made with Clark Equipment Co. of Battle Creek, Mich.

U.S. Has Copper Scrap Price Ceiling Order in Drafting Stage

Washington—Government is seriously considering price ceilings on copper scrap. Such an order is in the drafting stage, officials hinted.

No similar action is now being planned for primary copper, however. Officials of the Economic Stabilization Agency believe primary prices are stable enough.

ESA officials, following an industry-government meeting on copper here last week said they had received "assurances from members of the industry that they would not advance their prices without first notifying the ESA."

Industry representatives pointed out at the government meeting that wages comprise the largest single factor in determining current copper costs.

Pittsburgh Steel Expansion To Boost Ingot Capacity 46 Pct

Pittsburgh—Pittsburgh Steel Co. announced an expansion program that will increase ingot capacity by 488,000 tons to 1,560,000 tons—a rise of 46 pct.

The company also will build a new continuous hot and cold-rolled strip-sheet mill as well as the new high-lift blooming-slabbing mill ordered last August. This will put Pittsburgh Steel in the sheet and strip business for the first time.

Ingot capacity will be increased by enlarging the existing 12 open-hearth furnaces at Monessen, Pa., from the present 150-ton heat capacity to 250-ton capacity. Pig iron capacity will also go up.

A certificate of necessity covering $36,338,450 of the cost has been granted by NSRB.

November Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Blast Furnace Capacity July 1, 1950	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL			
									Pct of Capacity	
			Nov.	Year to Date	Nov.	Year to Date	Nov.	Year to Date	Nov.	Year to Date
Distribution by Districts:										
Eastern	12	13,353,580	1,072,553	11,513,516	20,092	287,023	1,092,645	11,800,539	99.4	96.6
Pitts.-Youngstn.	16	26,735,520	1,844,894	21,896,633	26,609	230,634	1,871,503	22,127,267	85.1	90.4
Cleve.-Detroit	6	7,044,600	539,431	6,220,587	.....	.....	539,431	6,220,587	93.1	96.5
Chicago	7	15,897,190	1,206,572	12,530,250	.....	.....	1,206,572	12,530,250	92.2	86.1
Southern	9	5,215,640	437,438	4,610,741	9,287	91,632	446,725	4,702,373	104.1	99.3
Western	4	3,375,200	229,962	2,410,119	.....	.....	229,962	2,410,119	82.2	78.6
Total	37	71,621,730	5,330,850	59,181,846	55,988	609,289	5,386,838	59,791,135	91.4	91.3

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Steel Capacity July 1, 1950	PRODUCTION							
			TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots-Hot Topped (Incl. in under total steel)	
					Pct of Capacity					
			Nov.	Year to Date	Nov.	Year to Date	Nov.	Year to Date	Nov.	Year to Date
Distribution by Districts:										
Eastern	24	20,387,460	1,589,885	17,103,875	94.8	92.9	123,324	1,181,705	304,056	3,133,642
Pitts.-Youngstn.	33	39,127,940	2,955,583	34,324,894	91.8	95.8	406,759	4,435,195	321,259	3,670,789
Cleve.-Detroit	8	9,333,460	760,478	8,458,403	99.0	99.0	49,877	513,414	93,327	1,103,346
Chicago	15	21,351,700	1,828,094	19,166,450	104.1	99.5	150,238	1,463,409	240,828	2,633,680
Southern	8	4,568,320	396,548	4,385,107	105.0	104.8	2,461	48,803	7,707	57,703
Western	11	5,774,620	481,263	4,914,750	101.3	93.7	14,493	94,866	12,876	95,793
Total	78	100,563,500	8,011,851	88,353,479	96.8	96.6	747,152	7,737,392	980,053	10,694,953

* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.65%, and Silicon in excess of 0.60%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements.

Republic, Hanna Seek Venezulean Ore

Have option on Maria Louisa (Sabeneta hill) claim . . . Exploration continuing . . . No deal yet on San Isidro . . . U. S. Steel to start construction on ore facilities this year.

Caracas, Venezuela — Tightening of the defense lines in the United States of America has placed the spotlight on iron ore discoveries in this country. It is to be expected that the close cooperation already given by the government to firms from North America will be continued.

Exploration is going forward by M. A. Hanna Co. and Republic Steel Corp. on their Maria Louisa concession at Sabeneta hill. That property is not far from the U. S. Steel's Cerro Bolivar concession. The two North American firms have an option on the Maria Louisa claim which was originally granted to Sr. Tabeo Schoen on a 50-year lease with right to renew for another 50 years.

The large San Isidro mountain, which is estimated to contain as much as 400 million or more tons of high-grade ore, is still the subject of interest to North American industry. So far no commitments have been made by the government but negotiations may be resumed in the near future.

Hauled by Rail to Port

If the Maria Louisa options turn out satisfactory to Republic and M. A. Hanna, it is likely that ore will eventually be moved to the contemplated U. S. Steel railroad and hauled over that line to seaport. Latest reports on U. S. Steel activities point to a readiness to start construction of needed facilities in 1951.

Main planning and design work on all parts of the giant undertaking at Cerro Bolivar are well along towards completion. Ore may be moving from there by mid 1954.

List U.S. Steel Co. Officers; Is Result of Subsidiaries Merger

Pittsburgh—Officers of United States Steel Co., resulting from the merger of Carnegie-Illinois Steel Corp., U. S. Steel Corp. of Delaware, H. C. Frick Coke Co., and U. S. Coal & Coke Co., follow:

B. F. Fairless, president; executive vice-presidents: C. F. Hood, operations; D. F. Austin, commercial; R. M. Blough, law and secretary; M. W. Reed, engineering and raw materials; G. W. Rooney, accounting.

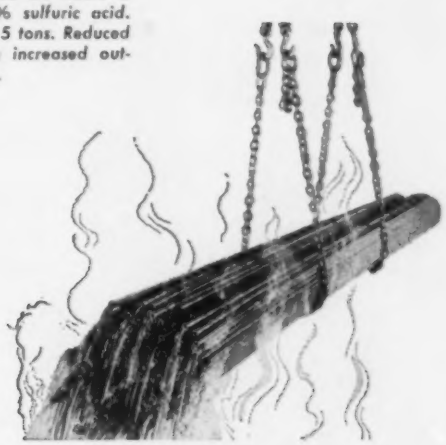
Assistant executive vice-presidents: F. R. Burnette, engineering; B. S. Chapple, Jr., commercial; vice-presidents: R. C. Cooper, industrial engineering; J. D. Darby, sales; C. A. Ilgenfritz, purchases; R. W. Hyde, treasurer.

H. E. Isham, asst. executive vice-president, accounting; S. M. Jenks, vice-president, manufacturing; S. B. Kingham, asst. executive vice-president, accounting; K. L. Konnerth, vice-president, coal division; L. L. Lewis, associate general solicitor.

J. E. Lose, asst. executive vice-president, operations; vice-presidents: E. E. Moore, industrial relations administration; L. M. Parsons, Washington; E. G. Plowman, traffic; B. L. Rawlins, associate general solicitor and asst. secretary; R. F. Sentner, asst. executive vice-president, commercial; J. A. Stephens, vice-president, industrial relations.

Vice-presidents: G. M. Thursby, industrial relations administration, coal division; W. A. Walker, accounting; A. C. Wilby, Chicago; J. L. Young, chief engineer, R. Zimmerman, research.

Former chains on these mechanical picklers used to fail in 2½ months. Monel chains are giving 1½ years' service 24 hours a day in hot, 10% sulfuric acid. Average load is 5 tons. Reduced shut-downs have increased output substantially.



Monel sling chains handling 4 to 5 tons of steel tubing. 75 such chains are in this plant. Where 1¼" chains of another metal failed in 9 months, these Monel chains have already served 6 years.

The Life is longer
The Weight is less
The Metal is Monel

Monel® Pickling Chain—like *any* piece of Monel pickling equipment—pays for itself.

Any pickling-room foreman or superintendent who has used Monel will tell you that.

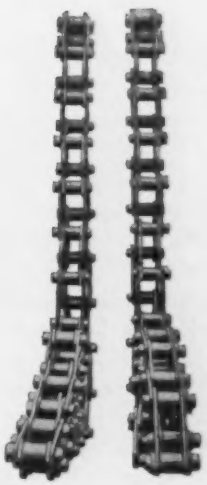
For he knows that Monel's superior resistance to corrosion by hot pickling acids and fumes means longer life and greater safety.

He knows, too, that the higher strength of Monel makes it possible to use *lighter* chain that saves up to 20% in dead weight.

Monel link chain is formed from hot-rolled rod, and welded. The welds retain all the strength and all the corrosion resistance of the parent metal.

Regular Monel chain ranges in size from ¼" to 1¼". In addition, special types of sprocket chain, as well as a complete line of accessories such as hooks, lifting links, U-bolts and open links are available.

Whether you are using chain as slings or in mechanical picklers, you'll get the maximum in safety, long life and light weight, if you make that chain *Monel!*



Mechanical pickler chains made of Monel for use in the pickling of steel pipe prior to galvanizing. Chains are so designed to permit quick and easy replacement of any individual part.

Although Nickel and Nickel Alloys are currently in short supply INCO advertisements will continue to bring you news of new products, applications, and technical developments.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE INCO TRADE MARK

Monel
PICKLING EQUIPMENT

extra life
extra capacity
extra safety

DMA Order Against Hoarding, Gray Market Bolsters NPA Notice

Ban put on deals in more than 50 ores, concentrates, other items.

Washington—The Defense Materials Administration last week banned (DMA Notice 1) hoarding and gray market deals in connection with more than 50 ores, concentrates and other forms of raw materials.

This action backs up NPA's Notice 1 which placed a similar ban over many of the basic products made from the materials covered by the DMA order. Like the NPA order, the DMA action applies to business or home consumption, forbids buying more than needed for use, and prohibits resale at more than market prices.

Scrap Industry's Problems To Be Discussed in N.Y. Jan. 14-16

New York—The scrap industry's relation to defense and rapidly expanding steel production and how to meet new problems confronting the industry will be discussed at the annual meeting of the Institute of Scrap Iron & Steel at the Hotel Commodore, Jan. 14 to 16.

Rising labor costs and the greater need for metals to meet the defense program and expansion of the steel industry will accelerate yard mechanization, the Institute believes. Yard mechanization will be the theme of an exhibit by manufacturers and suppliers.

A workshop meeting for chapter officers will be held Sunday morning. Directors will meet in the afternoon.

Stanley M. Kaplan, Institute president, will open the business session Monday morning. A session for yard dealers and balers in the afternoon will discuss costs, safety and other aspects of operation. The annual banquet will be held in the evening.

A proposed program for public relations will be presented at the business session Tuesday morning.

STEEL

CONSTRUCTION NEWS

Recent fabricated steel awards included the following:

4730 Tons, East Boston, Mass., elevated structure and new highways from Porter and London Sts., East Boston, Bremen St., Neptune Road to McLellan Highway (extensions to the East Boston Expressway), Charles A. Fritz, district engineer. Completion date Oct. 15, 1952 through V. Barletta Co., Jamaica Plain, Mass., to Harris Structural Steel Co., New York.

1000 Tons, Jersey City, N. J., railroad bridge for Erie RR, to American Bridge Co., Pittsburgh.

606 Tons, Lehigh County, Pa., State Highway and Bridge Authority, bridges on Route LR 771 Sect. 2, to Bethlehem Steel Co., Bethlehem.

450 Tons, Philadelphia manufacturing buildings for Heintz Mfg. Co., to Bethlehem Fabricating Co., Bethlehem.

387 Tons, Berkshire, Vt., 3 span continuous W F Beam bridge, concrete floor beginning at routes 105 and 118 at East Berkshire. G. A. Pierce, St. Albans, Vt., district highway commissioner. Completion date Dec. 1, 1951. Oscar L. Olson, Montpelier, Vt., low bidder.

253 Tons, Darien, Conn., 3 span continuous rolled beam bridge. Paul Bacco and Son Inc., Stamford, Conn., low bidder.

253 Tons, Waukesha County, Wis., bridge project F 06-1/24/ to Milwaukee Bridge Co.

225 Tons, Scranton, Pa., store for Kresge Co., to Anthracite Bridge Co., Scranton.

140 Tons, Vineland, N. J., retail store for Sears Roebuck & Co., to Robinson Iron and Steel Co.

110 Tons, Marinette County, Wis., bridge project 5-0544/1/ to Milwaukee Bridge Co.

110 Tons, Philadelphia, State Police Barracks, to Max Corchin & Son, Philadelphia.

Recent fabricated steel inquiries included the following:

6000 Tons, Cromby, Pa., powerhouse for Philadelphia Electric Co., bids due Jan. 19.

1300 Tons, Newark, N. J., highway bridge for New Jersey State Highway Commission, Route 25, Sect. 1-G, bids due Jan. 23.

1000 Tons, Trenton, N. J., additional construction for U. S. Navy aeroturbine laboratory, bids due Jan. 25.

Recent reinforcing bar awards included the following:

699 Tons, East Boston, Mass., extensions to East Boston Expressway through V. Barletta Co., Jamaica Plain, to Bethlehem Steel Co., Bethlehem.

650 Tons, Milwaukee, Athletic Stadium, to Joseph T. Ryerson & Son, Chicago.

550 Tons, Newport, Ky., Atomic Energy Research Building, to H. J. Baker.

535 Tons, Crawford County, Pa., paving LR 82, to Bethlehem Steel Co.

525 Tons, Montgomery County, Pa., Pennsylvania Dept. of Highways, Route 769, Sect. 1D and 2A, F. A. Canuso & Son, Philadelphia, general contractor.

470 Tons, Louisville, Philip Morris and Co., to U. S. Steel Supply Co.

450 Tons, Rochester, Minn., service center building, to U. S. Steel Supply Co.

Steel Construction News

Continued

228 **Tons,** Lehigh County, Pa., Pennsylvania Dept. of Highways, Route 771, Sect. 2, C. W. Good, Lancaster, Pa., general contractor.

220 **Tons,** Newtown and Southbury, Conn., 4 span steel deck girder bridge, Mariani Construction Co., New Haven, Conn., low bidder.

210 **Tons,** Barrington, Ill., Jewel Tea Co. building to Truscon Steel Co.

190 **Tons,** Indiana County, Pa., paving LR-902, to Bethlehem Steel Co.

160 **Tons,** Auburn, Ala., men's dormitory, Alabama Polytechnic Institute, to Truscon Steel Co., Birmingham

160 **Tons,** McKeesport, Pa., hospital, to Lind Steel Co.

135 **Tons,** Whiting, Ind., Standard Oil Co., to U. S. Steel Supply Co.

130 **Tons,** DuPage County, Ill., Reactor Building, Argonne National Laboratory, to U. S. Steel Supply Co.

126 **Tons,** Berks County, Pa., Pennsylvania Dept. of Highways, Routes 06150 and 06038, Central Pennsylvania Quarry, Stripping & Construction Co., general contractor.

115 **Tons,** Pittsburgh, School of Industrial Administration, Carnegie Tech, to Dambach Co.

112 **Tons,** Darien, Conn., 3 span continuous rolled beam bridge, Paul Bacco and Son, Stamford, Conn.. low bidder.

100 **Tons,** Chicago, Central Steel & Wire Co. warehouse, to Ceco Steel Products Co., Chicago.

Recent reinforcing bar inquiries included the following:

2200 **Tons,** Louisville, housing project.

1450 **Tons,** Gary, Ind., water filtration plant.

970 **Tons,** Chicago, Wacker Drive from Madison to Washington St.

860 **Tons,** Allegheny County, Pa., road work LR 766.

800 **Tons,** Minneapolis, warehouse building.

625 **Tons,** Aurora, Minn., steam electric plant.

500 **Tons,** Louisville, high school.

500 **Tons,** Chicago, Auxiliary sewer contract 3A.

470 **Tons,** Rochester, Minn., Service center building.

400 **Tons,** Detroit, Great Lakes Steel Corp., blast furnace.

376 **Tons,** Westville, Ind., Dr. Norman Beatty Hospital.

235 **Tons,** Altoona, Blair County, Pa., Easterly Sewage Treatment Works.

215 **Tons,** Chicago, terminal building O'Hare Airport.

200 **Tons,** Iowa City, Iowa, children's hospital.

200 **Tons,** Cleveland, Shelby Mutual Insurance Bldg.

150 **Tons,** Orrville, Ohio, sewage treatment plant.

150 **Tons,** Akron, Ohio, Akron expressing system.

150 **Tons,** Milwaukee, Hall Chevrolet garage.

135 **Tons,** Albion, Mich., Albion College.

120 **Tons,** Moline, Ill., power station boiler room, Iowa-Illinois Gas and Electric Co.

115 **Tons,** Omaha, Missouri railroad bridge.

100 **Tons,** Detroit, annealing furnaces, Ford Motor Co.

Recent steel piling awards included the following:

196 **Tons,** Darien, Conn., 3 span continuous rolled beam bridge. Paul Bacco and Sons, Stamford, Conn., low bidder.

Tighten Cadmium Controls; Inventories Limited to 30 Days

Washington—Controls over both civilian and military use of cadmium were tightened last week in an NPA order specifying defense uses. The order, M-19, also limited inventories to a 30-day supply.

Among the cadmium-containing items which may be produced are: bearings for rolling mills and heavy duty diesels, resistance welding electrodes, shunt wire leads, silver brazing alloys containing not more than 19 pct cadmium, low melting point alloys for anchorage of punch press dies and drill jig bushings, copper base alloys containing no more than 1¼ pct (by weight) cadmium, zinc base alloys for specific purposes, and a long list of electrical items and parts.

Carnegie to Enlarge Blast Furnace; Add 112,000 Annual Tons

Youngstown, Ohio — Carnegie-Illinois Steel Corp. will increase blast furnace capacity at its Ohio Works by 112,000 tons a year with the rebuilding and enlarging of No. 5 blast furnace, which will be shut down soon. Daily rated capacity of the furnace will be increased by more than 300 tons.

At the same time two new turbo-blowers will be built to replace four obsolete, gas engine-driven blowers to provide additional wind pressure for the plant's blast furnaces, and two boilers supplying steam for the furnace steam blowing facilities will be equipped with new coal pulverizers.

Canada to Raise Cobalt Output

Ottawa—Exports of scarce cobalt to the United States will increase when Canada gets the ball rolling on its plan to expand production, government sources indicated. Increased output will help Canada meet her own and some U. S. needs. Canadian production in 1950 is estimated at 626,000 lb —a slight gain over 1949.

production ideas

Continued from Page 36

gen to the powder chamber through a normally-open valve, and pressurizes the dry chemical for discharge. A 50-ft hose has a dis-

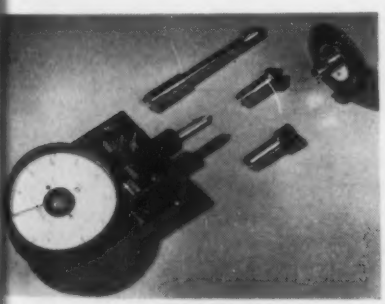
charge nozzle with stirrup-type control lever, for off, fan and straight powder streams. The extinguisher is suitable for combating flammable liquid (Class B) and electrical (Class C) fires in industrial plants. *Walter Kidde & Co., Inc.*

For more data insert No. 25 on postcard, p. 33.

Hand Tachometer

Features extremely low torque; guaranteed accuracy of 0.5 of 1 pct.

Ranges of the new Smiths Model A.T.H. 10 dual-range hand tachometer are 0/1000 and 0/5000 rpm, each of which is printed on the dial in a contrasting color. Revolving



Alnico permanent magnet inside of the drag cup assures extreme sensitivity and accuracy over the entire scale range. The instrument is provided with a knurled knob for range selection and pushbutton for releasing or holding the pointer at the machine speed indication. The instrument is packed in a carrying case, complete with male and female centers, 3½ in. extension and 6-in. circumference surface measuring disk. *Equipoise Controls, Inc.*

For more data insert No. 26 on postcard, p. 33.

Layout Kit

Scale models demonstrate the values obtained from 3-dimensional planning.

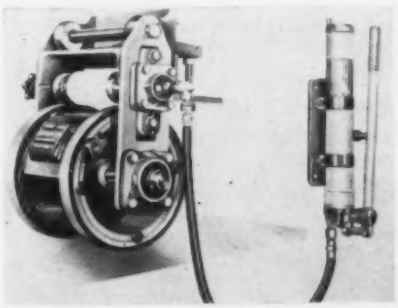
A 200-piece kit of ¼-in. scale models of machines, benches, trucks, conveyers, materials - handling equipment, office equipment, together with a 12 x 18-in. Lucite planning board, columns and layout tape enables the user to test the merit of three-dimensional planning before accepting or rejecting its values. *Visual Planning Equipment Co.*

For more data insert No. 27 on postcard, p. 33.

Coil and Sheet Marker

Automatically imprints trademarks, heat numbers, identification marks.

The printer was developed in cooperation with men in the strip steel mills, for the automatic imprinting of trademarks, heat numbers and inspector's identification



mark on each sheet or coil as it emerges from the temper mills or shear lines. The unit is fundamentally a revolving cylinder to which a rubber printing die is fastened. As the cylinder is revolved by the rubber drive tires in contact with the steel passing beneath, a clean, legible, inked impression is made. An internal feed inking unit insures control of ink distribution. The marker can be used for marking on a flat surface, or it can be mounted directly on top of the coil at the reel. *Jas. H. Matthews & Co.*

For more data insert No. 28 on postcard, p. 33.

Speed Reducers

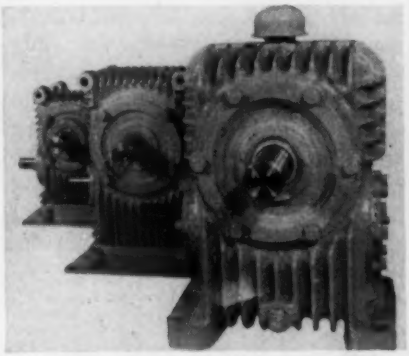
Improved appearance, greater casting uniformity feature improved line.

Employing double-enveloping gearing, all operating parts in the improved standard line are directly

production ideas

Continued

interchangeable with former models. Shown are reducers of 2, 2½ and 3 in. center distance. They are available in standard ratios of 5:1



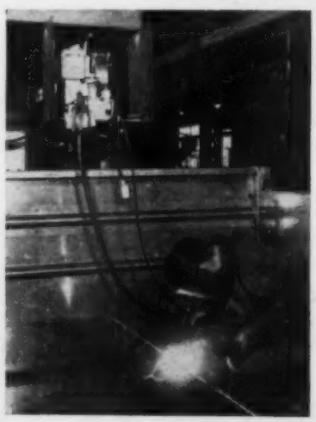
to 50:1 (60:1 on the 3 in.). Horsepower ratings for these compact reducers range as high as 9.04 hp at 1750 rpm. *Cone-Drive Gear Div. Michigan Tool Co.*

For more data insert No. 29 on postcard, p. 33.

Hand Welding Equipment

Combines argon metal arc hand-welding torch and rod feed unit.

Fast welding is possible with a new argon metal arc hand-welding torch and automatic wire drive unit that uses consumable electrode as the filler metal. Welding rod is fed

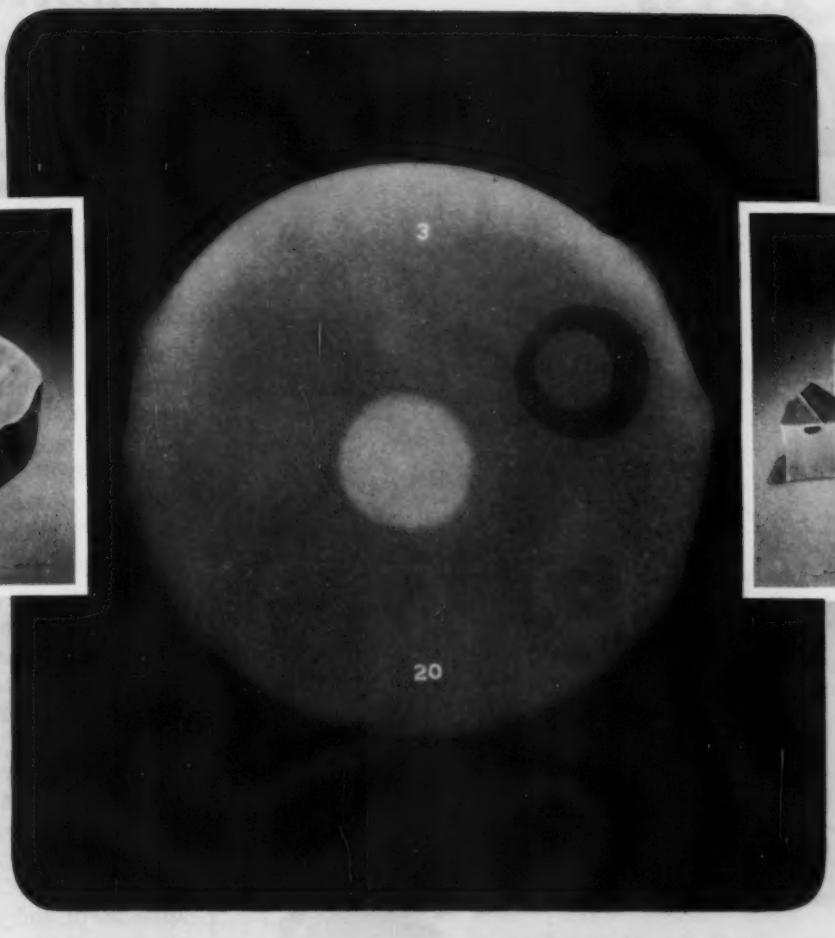


from a coil into an argon-protected atmosphere at a steady predetermined rate. The equipment is particularly adaptable for welding aluminum in ranges of ⅛ to 1½ in. thick. Hand-welding can be applied on butt, lap, fillet, edge, and corner joints in the overhead and vertical, as well as in the horizontal and flat positions. *Linde Air Products Co.*

For more data insert No. 30 on postcard, p. 33.

Resume Your Reading on Page 37

◆ Aluminum alloy casting 2¼ x 1 1¼" for aircraft accessory part.



◆ Radiograph which revealed defect in casting.

◆ Section reveals hole detected by radiography.

Minutes of Radiography saved hours of machining

AFTER machining, this aluminum alloy casting was to be an important part in an aircraft accessory, vital to high-altitude flying. The finished part was needed quickly by the customer. Design specifications demanded high quality.

This was no time to wait for machining to disclose any defects. There was too much to lose —setup time, machining time, take-down time, as well as the reputation of the foundry.

Radiography saved all that. In a few minutes it revealed a defect that caused rejection of the rough casting at the foundry. Other castings, proved sound by radiography, were sent to the customer.

Cases like this show how more and more foundries are able to release only sound castings. Perhaps even more important, radiography is showing how to make consistently sound castings, by picturing the internal effects of changes in gating, venting, chilling, pouring temperature, and other variables.

Ask your x-ray dealer to explain how radiography can help you increase yield and cut costs.

EASTMAN KODAK COMPANY
X-Ray Division, Rochester 4, New York

Radiography . . .

another important function of photography

Kodak
TRADE-MARK

publications

Continued from Page 32

material, recommended uses, chemical composition, and physical and mechanical properties, in both tabular and graphic form. Nine pages of graphs compare the mechanical properties of the various Haynes alloys. Age-hardening data and fabrication procedures are also included. Engineers and metallurgists who design or specify equipment for high-temperature use will find the book an invaluable aid in the selection of alloys. *Haynes Stellite Div., Union Carbide & Carbon Corp.*

For free copy insert No. 8 on postcard, p. 33.

New Micrometers

Distinctive features available in the completely new Brown & Sharpe micrometers are shown in a new 12-p. catalog listing prices and specifications of the various models. Shown in detail are such items as carbide measuring faces; large diameter thimble, wide divisions, greater magnification; stainless steel construction and rust resistant finish; sliding taper thread adjustment and adjustable thimble, all contributing to easier precision measurement. *Brown & Sharpe Mfg. Co.*

For free copy insert No. 9 on postcard, p. 33.

Pit-Type Furnaces

Pit-type furnaces for controlled atmosphere heat treatment are discussed in a new 4-p. bulletin presenting a complete description of the application of these batch-type furnaces. Performance data, engineering construction features and applications of the furnaces to heat treatments such as gas case carburizing, homogeneous carburizing, dry cyaniding, clean hardening and bright annealing are presented. A practical formula for calculating size of load to be placed in a basket or fixture of given size is supplied, and the newest developments, such as the integrally built RX atmosphere gas generator, are presented in detail. Work handling methods with minimum labor costs and materials handling equipment investment are also described. *Surface Combustion Corp.*

For free copy insert No. 10 on postcard, p. 33.

Resume Your Reading on Page 33

IRON AGE *markets and prices*

market briefs and bulletins

supreme court rules on prices — The Supreme Court ruled this week that a firm can lower prices in "good faith" to meet competitors' prices even if competition among its customers is injured. In a case involving Standard Oil Co. of Indiana the Federal Trade Commission had ruled that "good faith" in cutting prices was not a binding factor since competition was injured. Justice Burton said, "Congress did not seek by the Robinson-Patman Act either to abolish competition or so radically curtail it that a seller would have no substantial right of self-defense against a price raid by a competitor."

continuous casting—Three American companies own a controlling interest in the newly formed Continuous Metalcast Corp., organized to take over U. S. and Canadian rights to the Junghans and Dunross patents and other related patents and facilities owned by Irving Rossi, new CMC president. Ownership is shared by: Allegheny Ludlum Steel Corp., 35 pct; Scovill Mfg. Co., 10 pct; and American Metal Co., Ltd., 10 pct; Mr. Rossi, 45 pct.

steel price stabilization — Steel industry and ESA officials have agreed a freeze on existing steel prices on a company-by-company basis is a sound and satisfactory approach to steel price stabilization. This is the first indication that ESA does not contemplate a rollback in steel prices. Earlier indications were prices might return to Dec. 1 levels.

tractor price rollback — Allis-Chalmers Mfg. Co. has rescinded tractor price increases of about 8 pct in compliance with ESA's order calling for a rollback to Dec. 1 price levels. Walter Geist, president, said the rollback will place the company in an "impossible" position unless its 8000 suppliers also roll back prices.

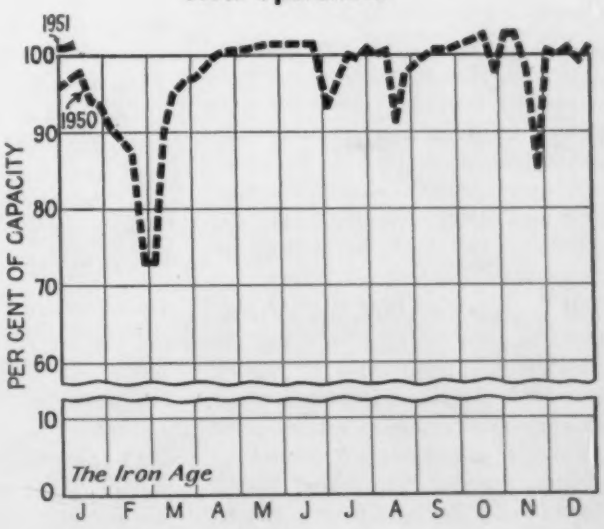
Chilean iron—Debevoise-Anderson Co. is now selling Chilean foundry grade pig iron for $64.55 in Philadelphia c.i.f. and duty paid. Other firms are reported to be importing both Chilean and Brazilian iron.

no end-use restrictions needed—Despite increasing defense requirements and supporting special programs, there is as yet no foreseeable need to restrict the end-use of steel, National Production Authority officials have told the Steel Products Advisory Committee. While additional steel allocations are in sight and some present regulations must be changed, such change would aim for as little disruption to steel distribution as possible, NPA said.

electrolytic zinc extras up—Weirton Steel Co. increased gage and width extras for 26 gage and heavier on electrolytic zinc coated sheets $3 to $7 per ton. Special killed quality is up $4, stretcher leveling extra $6, restricted thickness tolerance $5. Item quantity brackets under 2000 lb were eliminated and extras were advanced $4 to $6 per ton.

all-time record—Business activity in the Pittsburgh District apparently rose to an all-time record in the last week of 1950. The University of Pittsburgh bureau of business research reported the index of industrial production rose to 222.2 in that week, a new high record.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Dec. 31	96.0*	104.0	92.5*	97.0	104.0*	104.0	97.0*	106.0*	103.0	104.0	90.0	90.5	101.0	101.0
Jan. 7	96.0	101.0	92.	98.0	104.0	104.0	97.0	106.0	97.0	106.0	90.0	99.5	98.0	102.5

* Revised.
** Steel operations for the first half of 1950 are based on annual capacity of 99,382,800 net tons. Beginning July 1, 1950, operations are based on new annual capacity of 100,563,500 net tons

nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Jan. 3	Jan. 4	Jan. 5	Jan. 6	Jan. 8	Jan. 9
Copper, electro, Conn. . .	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake, delivered . .	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.52	$1.57	$1.56	. . . .	$1.59	$1.61*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	16.80	16.80

Note: Quotations are going prices.

*Tentative.

by R. Hatschek

New York — Members of the zinc, lead and copper industries met in Washington last week with government officials on the subject of price controls and in view of the stability displayed by these metals, their prices will not be controlled for the present. Current prices for these metals were established as follows: Copper, Oct. 2; lead, Oct. 31; and zinc, Sept. 7.

Committee to Aid ESA

The Economic Stabilization Agency stated that it has been assured by industry members that prices would not be raised without advance notice. A full-time advisory committee for the zinc and lead industries is planned for assisting the ESA in setting up price stabilization programs.

It is reported that the government is soon to issue an order requiring all companies to notify the ESA 30 days in advance of raising any prices. Certain farm products are excluded from the proposed order. The effect would be that of a 30-day fixing of prices and is only intended to hold back inflationary trends until personnel for administering a full-scale price control program can be assembled.

Now that the new Congress has convened, the hue and cry for the retroactive suspension of the 2¢ copper import duty is once again heard in Washington. The new 1½¢ duty on lead is also the subject of Washington discussions. Under present-day conditions of supply and demand, and with prices under voluntary control and preparing to go under full control, these tariffs are doing little to help our defense production and are causing some difficulty by virtue of the split-price markets they cause.

At least in the case of the lead duty, one alternate to suspending the tariff has been suggested. This is to have some government agency, such as the Reconstruction Finance Corp., buy foreign lead and then resell it to consumers. This, however, would require more time than the needs of defense dictate.

Inco Lowers Price Hikes

In complying with the government request to hold prices back, International Nickel Co. last week reduced the amount of their recent price increases on nickel and Monel mill products. The rollbacks ranged from ½¢ to 5¢ per lb and are retroactive to Dec. 13, the date of the last increase. The new prices are 2½¢ higher than the nickel prices and 4¢ higher than the Monel prices prevailing before that time. Primary nickel prices were not affected by the reduction.

Ingot makers' buying prices for scrap aluminum dropped ½¢ to 1½¢ per lb with the result that secondary metal is selling at ¼¢ to ½¢ lower this week. Dealers' buying prices for aluminum scrap are about ½¢ lower on the bottom side of the price spread and the tone of the market is softer.

Copper Order in Drafting Stage

While primary copper is not due for immediate price control, copper scrap price regulations are said to be in the drafting stage in Washington. There is some strong feeling in the scrap metals trade that mandatory controls are the only ones that have any chance of working.

NPA proposals came out thick and fast last week. Another was for an order limiting the use of tin and aluminum in collapsible tubes for certain products. The purpose of this order is to enable the collapsible tube industry to produce at the current levels despite the reduced amount of metal available to these manufacturers during 1951.

The newly formed Defense Minerals Administration has indicated that it will approve a copper mine project in Michigan's upper peninsula. The project might involve a $100,000,000 loan from the government.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.; Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb. base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks		50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.18	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask f.o.b. New York	$182 to $185
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.61
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.50
Manganese bronze	
No. 421	30.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	31.00-31.50
No. 12 alum. (No. 2 grade)	30.50-31.00
108 alloy	30.75-31.25
195 alloy	32.25-32.75
13 alloy	33.50-34.00
ASX-679	30.75-31.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.00-32.50
Grade 2—92-95%	30.25-31.00
Grade 3—90-92%	29.50-30.00
Grade 4—85-90%	29.00-29.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39¼
Electrodeposited	33⅝
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34⅜
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.35
Zinc cyanide, 100 lb drums	45.35

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	20¼	18¾
Red brass	21½	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18¾
Brass rod ends	19¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	18.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	21.00
No. 2 copper wire	20.00
Light copper	19.00
No. 1 composition	20.00
No. 1 comp. turnings	19.75
Rolled brass	16.50
Brass pipe	18.50
Radiators	15.25
Heavy yellow brass	15.00
Aluminum	
Mixed old cast	18½
Mixed new clips	20½
Mixed turnings, dry	18½
Pots and pans	18½—18¾
Low copper	21½—21¾

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	19½—20
No. 2 heavy copper and wire	18 —18⅛
Light copper	17 —17¼
New type shell cuttings	17 —17¼
Auto radiators (unsweated)	14½—15
No. 1 composition	17 —17⅛
No. 1 composition turnings	16½—17
Clean red car boxes	15½—16
Cocks and faucets	15½—16
Mixed heavy yellow brass	13 —13½
Old rolled brass	14 —14½
Brass pipe	17 —17½
New soft brass clippings	17½—18
Brass rod ends	16½—17
No. 1 brass rod turnings	16 —16¼
Aluminum	
Alum. pistons and struts	12 —13
Aluminum crankcases	15 —16
2S aluminum clippings	18½—19½
Old sheet and utensils	15 —16
Borings and turnings	12½—13
Misc. cast aluminum	15 —16
Dural clips (24S)	15 —16
Zinc	
New zinc clippings	14½—15
Old zinc	11 —11¼
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	57 —60
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel Clippings	22 —25
Clean Monel turnings	18 —20
Old sheet Monel	20 —22
Inconel clippings	26 —28
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	15 —15¼
Battery plates (dry)	8¾— 9
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	85 —90
No. 1 pewter	63 —65
No. 1 auto babbitt	58 —60
Mixed common babbitt	12¼—12½
Solder joints	18½—19
Siphon tops	58 —60
Small foundry type	16¼—16½
Monotype	14¾—15
Lino. and stereotype	14½—14¾
Electrotype	12¾—13
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8 — 8¼
Electro. dross	6½— 6¾

SCRAP *iron and steel*

markets
prices
trends

Trade sees ESA lopping off $1.50 from present formula prices . . . Hot demand forces mills into active buying in some markets.

In the fog of rumors and counter-rumors, a rule of the thumb for figuring out coming Economic Stabilization Agency scrap pricing schedules could be dimly seen. Still a rumor, with a little more weight than most, the rule is: deduct $1.50 from present formula prices on openhearths, low phos, and blast furnace grades. (See p. 75 for story on Washington scrap meetings and possible pricing results.)

Signs pointed to a violent demand that was forcing some mills into active buying despite signs that controls will sink prices below current formula levels. In Pittsburgh mills were "competing briskly" for scrap and upgrading continued. Some reported here that some users are paying more than the formula permits. At last week's Washington scrap meeting, the trade suggested a price of $44, plus $1 commission, for No. 1 heavy for the Pittsburgh area.

The watch and wait attitude was a damper to price rises and generally increases were negligible. The Detroit market edged toward price stability and the tonnage of free scrap moving over the formula was no longer significant.

PITTSBURGH — Despite indications that controlled prices will be below existing levels, mills are still competing briskly for available scrap. Upgrading continues commonplace and reports are that some consumers are paying more than the so-called formula. Final word on controlled prices is expected next week following Thursday's meeting of consumers and brokers with price control authorities in Washington. At last week's session the industry recommended a price of $44, plus $1 commission, for No. 1 heavy melting at Pittsburgh. This would be exclusive of springboards a consumer might pay to bring in scrap long distances. Short turnings would be $38, plus $1 commission.

CHICAGO — Reports heard in the trade last week indicated that price controls on scrap would be imposed in the near future, possibly Jan. 15, with 2 weeks to clear up old orders. Ceiling prices on openhearth grades are expected to be $1.50 below the last formula prices. This would make No. 1 heavy melting steel and No. 1 bundles $43.50, No. 2 heavy melting $41.50 and No. 2 bundles $40.50. Short shoveling turnings are expected to be $6 per gross ton under No. 1 heavy melting and machine turnings $10 under No. 1.

PHILADELPHIA — Prices in this district remained stable with the exception of rail specialties which moved up $2 per ton to a range of $55 to $56. The freight car shortage continued to hamper scrap shipments and the strike of Philadelphia tugboat operators delayed unloading of several ships carrying scrap. Dealers in the area are selling all the material they can so that they will not be caught with a lot of high-priced inventory when scrap price controls are announced. Rollbacks are expected particularly in cast material and there is a possibility that cast grades will go to an f.o.b. shipping point pricing system.

NEW YORK—Movement of scrap and demand were lively in this market. The trade had its attention on the things to come from ESA and awaited a price control decision to stem from another scrap meeting in Washington this week. In this atmosphere of watchful waiting, the price line held on all items. It was reported some users were paying above the formula on some steelmaking grades.

DETROIT—In the face of threatened controls, the Detroit scrap market is edging cautiously toward price stability. While some dealers are apparently holding out, the tonnage of free scrap moving at higher than formula prices is no longer significant. Pressures to sell at formula have been increasing and most dealers have been responding by emptying their yards before the price drops. Cast grades have been somewhat weaker.

CLEVELAND — With buyers and brokers waiting for definite information from Washington, the market here and in the valley is in a state of suspended animation. Mills are buying practically anything that is offered and paying big springboards on remote tonnage. Shipments to some mills are not equal to consumption and tonnage is being taken from inventory to maintain operations.

ST. LOUIS—Major topic in the trade here is the new price schedule, which is expected to be announced Jan. 15, or thereabouts. Brokers are betting that No. 1 heavy melting steel will be pegged at $42 here and No. 2 at $39. Major consumers have placed their January orders and scrap is moving. Foundry grades are quiet, with buyers anticipating a break in prices.

BIRMINGHAM — All scrap steel is moving in the district at formula prices now. Cast iron is moving into the district in large quantities and the price, which has been out of line for some time is becoming normal and may drop a little more, brokers say.

CINCINNATI — Rumors of a rollback have the market here in high emotional gear, but steel mill grades are moving at quoted prices. Most persistent report has it that No. 1 heavy melting steel will be pegged at $42 here. Trading in the foundry grades is at low ebb, despite reports of a $5 to $7 price drop in the south. Mills want scrap and are showing no hesitancy in buying at the present level.

BOSTON — The market in scrap steel was active here this week, though prices remained unchanged. Brokers and dealers waited with crossed fingers for news from Washington on prices. Quite a demand for cast was noted.

BUFFALO — While the scrap trade awaits pending price controls, concern is in evidence over a shrinkage in supplies. A leading mill consumer was making sharp inroads on reserve stocks to maintain production. The thought prevails that available supplies are a more disturbing factor than prices. Speculations on possible controls seem to be that there would be no appreciable change in prices on steelmaking items. New business was deferred, but dealers still were shipping against old orders.

H. KLAFF & COMPANY, INC., Ostend & Paca Sts., Baltimore 30, Md.

Buyers of STAINLESS SCRAP, STRAIGHT CHROMES, NICHROME, PURE NICKEL, NICKEL ALLOYS & INCONEL

Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	42.75 to 43.50
Machine shop turn.	37.75 to 38.50
Mixed bor. and ms. turns.	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	56.00 to 56.50
Heavy turnings	46.50 to 47.00
No. 1 RR. hvy. melting	45.75 to 46.50
Scrap rails, random lgth.	64.50 to 65.00
Rails 2 ft and under	68.00 to 69.00
RR. steel wheels	63.00 to 64.00
RR. spring steel	63.00 to 64.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	67.50 to 68.00
Mixed yard cast.	57.50 to 58.00
Heavy breakable cast	52.50 to 53.00
Malleable	71.00 to 72.00

Chicago

No. 1 hvy. melting	$44.25 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 factory bundles	44.00 to 45.00
No. 1 dealers' bundles	44.00 to 45.00
No. 2 dealers' bundles	41.00 to 42.00
Machine shop turn.	35.00 to 36.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	37.00 to 38.00
Low phos. forge crops	54.00 to 55.00
Low phos. plate	52.00 to 53.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	62.00 to 63.00
Rerolling rails	65.50 to 66.50
Rails 2 ft and under	67.00 to 69.00
Locomotive tires, cut	58.00 to 59.00
Cut bolsters & side frames	54.00 to 55.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	95.00 to 100.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	62.00 to 64.00
No. 1 agricul. cast.	58.00 to 60.00
Heavy breakable cast.	53.00 to 55.00
RR. grate bars	48.00 to 49.00
Cast iron brake shoes	52.00 to 53.00
Cast iron car wheels	58.00 to 59.00
Malleable	78.00 to 82.00

Philadelphia

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles	44.00 to 45.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	38.00 to 39.00
Low phos. punchings, plate	50.00 to 51.00
Low phos. 5 ft and under	50.00 to 51.00
Low phos. bundles	48.00 to 49.00
Hvy. axle forge turn.	44.00 to 45.00
Clean cast chem. borings	42.00 to 43.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
Rails 18 in. and under	66.00 to 67.00
No. 1 machinery cast.	62.00 to 63.00
Mixed yard cast.	53.00 to 55.00
Heavy breakable cast.	53.00 to 54.00
Cast iron carwheels	67.00 to 68.00
Malleable	69.00 to 70.00

Cleveland

No. 1 hvy. melting	$45.25 to $46.00
No. 2 hvy. melting	43.25 to 44.00
No. 1 busheling	45.25 to 46.00
No. 1 bundles	45.25 to 46.00
No. 2 bundles	42.25 to 43.00
Machine shop turn.	37.25 to 38.00
Mixed bor. and turn.	39.25 to 40.00
Shoveling turnings	39.25 to 40.00
Cast iron borings	39.25 to 40.00
Low phos. 2 ft and under	47.75 to 48.50
Steel axle turn.	44.25 to 45.00
Drop forge flashings	45.25 to 46.00
No. 1 RR. hvy. melting	46.00 to 46.50
Rails 3 ft and under	70.00 to 71.00
Rails 18 in. and under	72.00 to 73.00
No. 1 machinery cast.	69.00 to 70.00
RR. cast.	71.00 to 72.00
RR. grate bars	50.00 to 51.00
Stove plate	55.00 to 56.00
Malleable	76.00 to 77.00

Youngstown

No. 1 hvy. melting	$45.75 to $46.50
No. 2 hvy. melting	43.75 to 44.50
No. 1 bundles	45.75 to 46.50
No. 2 bundles	$42.75 to $43.00
Machine shop turn	37.75 to 38.50
Shoveling turnings	39.75 to 40.50
Cast iron borings	39.75 to 40.50
Low phos. plate	48.25 to 49.00

Buffalo

No. 1 hvy. melting	$44.50 to $45.25
No. 2 hvy. melting	42.50 to 43.25
No. 1 busheling	42.50 to 43.25
No. 1 bundles	43.50 to 44.25
No. 2 bundles	41.50 to 42.25
Machine shop turn.	36.50 to 37.25
Mixed bor. and turn.	36.50 to 37.25
Shoveling turnings	38.50 to 39.25
Cast iron borings	36.50 to 37.25
Low phos. plate	48.25 to 49.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	60.00 to 61.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	60.00 to 61.00
No. 1 machinery cast.	59.00 to 60.00
No. 1 cupola cast.	54.00 to 55.00
Small indus. malleable	60.00 to 61.00

Birmingham

No. 1 hvy. melting	$42.50 to $43.50
No. 2 hvy. melting	40.50 to 41.50
No. 2 bundles	39.50 to 40.50
No. 1 busheling	38.00 to 39.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	27.00 to 28.00
Bar crops and plate	47.00 to 48.00
Structural and plate	46.00 to 47.00
No. 1 RR. hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	58.00 to 59.00
Rerolling rails	61.00 to 62.00
Rails 2 ft and under	66.00 to 67.00
Angles & splice bars	59.00 to 60.00
Std. steel axles	61.00 to 62.00
No. 1 cupola cast.	55.00 to 56.00
Stove plate	51.00 to 52.00
Cast iron carwheels	46.00 to 47.00

St. Louis

No. 1 hvy. melting	$43.75 to $44.50
No. 2 hvy. melting	41.75 to 42.50
No. 2 bundled sheets	40.75 to 41.50
Machine shop turn.	35.75 to 36.50
Shoveling turnings	37.75 to 38.50
Rails, random lengths	54.00 to 55.00
Rails 3 ft and under	62.00 to 63.00
Locomotive tires, uncut	52.00 to 53.00
Angles and splice bars	59.00 to 60.00
Std. steel car axles	94.00 to 95.00
RR. spring steel	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Hvy. breakable cast.	48.00 to 49.00
Cast iron brake shoes	53.00 to 54.00
Stove plate	53.00 to 55.00
Cast iron car wheels	63.00 to 65.00
Malleable	55.00 to 57.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 2 bundles	36.00
Machine shop turn.	31.00
Mixed bor. and turn.	31.00
Shoveling turnings	33.00
Clean cast chem. bor.	$38.00 to 39.00
No. 1 machinery cast.	52.00 to 53.00
Mixed yard cast.	47.00 to 48.00
Charging box cast.	47.00 to 48.00
Heavy breakable cast.	46.00 to 47.00
Unstrp. motor blocks	42.00 to 43.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$35.67
No. 2 hvy. melting	33.67
No. 1 bundles	36.00
No. 2 bundles	$32.67
Machine shop turn.	27.67
Mixed bor. and turn.	$26.67 to 27.67
Shoveling turnings	29.67
No. 1 busheling	35.67
Clean cast chem. borings	33.00 to 34.00
No. 1 machinery cast.	48.00 to 49.00
Mixed cupola cast.	44.00 to 45.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	42.00 to 43.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$40.25
No. 2 hvy. melting	38.25
No. 1 bundles, openhearth	40.25
No. 1 bundles, electric furnace	42.75
New busheling	40.25
Flashings	40.25
Machine shop turn.	32.25
Mixed bor. and turn.	32.25
Shoveling turnings	34.25
Cast iron borings	34.25
Low phos. plate	42.75
No. 1 cupola cast.	$54.00 to 56.00
Heavy breakable cast.	45.00 to 47.00
Stove plate	44.00 to 46.00
Automotive cast.	58.00 to 60.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$44.25
No. 2 hvy. melting	42.25
No. 1 bundles	44.25
No. 2 bundles, black	42.25
No. 2 bundles, mixed	41.25
Machine shop turn.	33.00
Mixed bor. and turn.	34.00
Shoveling turnings	34.00
Cast iron borings	34.00
Low phos.-steel	46.75
Low phos. 18 in. under	62.00
Rails, random lengths	$62.00 to 63.00
Rails, 18 in. and under	72.00 to 73.00
No. 1 cupola cast.	65.00 to 66.00
Hvy. breakable cast.	59.00 to 60.00
Drop broken cast.	71.00 to 72.00

San Francisco

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Machine shop turn.	16.00
Elec. fur. 1 ft and under	$40.00 to 42.50
No. 1 RR. hvy. melting	30.00
Scrap rails random lgth.	30.00
No. 1 cupola cast.	43.00 to 46.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	28.00
No. 1 bundles	30.00
No. 2 bundles	28.00
No. 3 bundles	25.00
Mach. shop turn.	16.00
Elec. fur. 1 ft and under	$42.00 to 45.00
No. 1 RR. hvy. melting	30.00
Scrap rails, random lgth.	30.00
No. 1 cupola cast.	52.00

Seattle

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	28.00
No. 1 bundles	22.00
No. 2 bundles	22.00
No. 3 bundles	18.00
Elec. fur. 1 ft and under	$40.00 to 45.00
RR. hvy. melting	29.00
No. 1 cupola cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 1 bundles	30.00
No. 2 bundles	29.50
Mechanical bundles	28.00
Mixed steel scrap	26.00
Mixed bor. and turn.	22.00
Rails, remelting	30.00
Rails, rerolling	33.00
Bushelings	24.50
Bush., new fact. prep'd.	29.00
Bush., new fact. unprep'd.	22.00
Short steel turnings	23.00
Cast scrap	45.00

Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-rolled Steel: (cents per pound)	Jan. 9, 1951	Jan. 2, 1951	Dec. 12, 1950	Jan. 10 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.18
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	3.995
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Jan. 9, 1951	Jan. 2, 1951	Dec. 12, 1950	Jan. 10 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	46.08
No. 2, Birmingham	48.88	48.88	48.88	39.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	181.20	181.20	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$46.13	$46.13	$46.25	$29.75
Heavy melt'g steel, Phila,	44.50	44.50	44.50	23.00
Heavy melt'g steel, Ch'go	44.63	44.63	44.50	26.50
No. 1 hy. com. sh't, Det.	40.25	40.25	43.13	23.50
Low phos. Young'n	48.63	48.63	48.63	31.75
No. 1 cast, Pittsburgh	67.75	67.75	66.75	37.50
No. 1 cast, Philadelphia	62.50	62.50	59.50	37.00
No. 1 cast, Chicago	63.00	63.00	65.00	38.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.61†	$1.50*	1.395	77.00
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	51.22	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	32.00	32.00

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

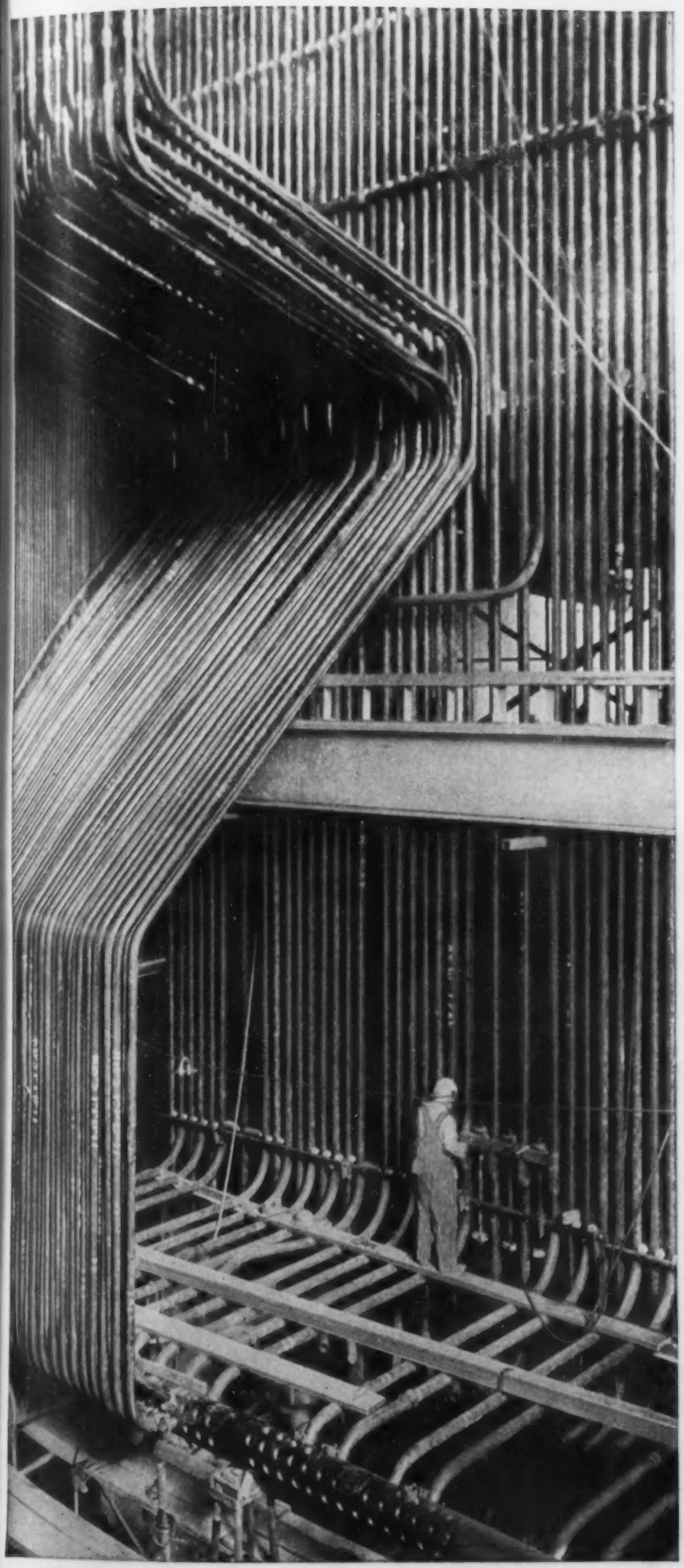
	Finished Steel Base Price	Pig Iron	Scrap Steel
Jan. 9, 1951	4.131¢ per lb.	$52.69 per gross ton	$45.09 per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	45.09 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	45.08 per gross ton
One year ago	3.837¢ per lb.	45.88 per gross ton	26.25 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Dec. 12	$45.09 Jan. 2	$45.09 Jan. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jar. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 26, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.



this "pipe organ" plays a POWERFUL tune for you!

This picture shows the "works" of a modern boiler attached to a huge power generator that turns out electricity from coal to the tune of 150,000 kilowatts—enough to operate 800,000 washing machines simultaneously!

In these 12 miles of pipe, rising 10 stories above the ground, water is turned into superheated steam by burning coal. The steam runs turbine-driven generators which produce electricity for home, farm and factory.

More than half of America's electricity is generated from coal. This past year more than *90 million tons* of coal went into making that electricity. That adds up to nearly one-fifth of the entire mine output of bituminous coal in 1950.

America is fortunate in having all the coal it *needs* to make all the electricity it *wants*. It is doubly fortunate in having an industry that can produce that coal in volume—efficiently and economically.

The American coal industry is made up of thousands of independent mine operators. In recent years, these progressive operators have invested hundreds of millions of dollars in new mine properties and mechanized equipment, in coal preparation plants and research—to bring all coal customers an increasingly *better* product for more *economical* utilization.

Today, no industry in America is better prepared than coal to meet the ever-increasing demands of both civilian and national defense production.

Granted a continuing supply of necessary equipment, transportation and trained man power, America's independently owned and operated coal mines will produce all the coal that's needed to continue to power the nation's progress, in peace or war.

BITUMINOUS COAL
BITUMINOUS COAL INSTITUTE
A DEPARTMENT OF NATIONAL COAL ASSOCIATION
WASHINGTON, D. C.

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[35]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17]	$70.00[1,4]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[35]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[2] 4.30[15]	4.10[2,4,33]	4.10[6]	4.10[2]			4.10[6]				4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[38]	3.60[6,33]	3.60[1,6,8]	3.60[4]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[36]		3.60[3]		3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15] 5.35[63]		4.35[1,6,8]	4.35[4]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]		4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,8]		4.80[4]	4.80[7]	6.00[64]					4.80[3]		
Enameling (12 gage)	4.65[1]		4.65[1,8]			4.65[7]								
Long ternes (10 gage)	5.20[9,15]						6.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,8] 5.90[6]	5.40[4]			5.40[1,4,15]		5.40[3]	5.65[36]		5.40[3]		
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,8] 7.05[6]	6.55[4]			6.55[4]		6.55[3]			6.55[3]		
Hi str. low alloy, galv.	7.20[1]													
STRIP Hot-rolled	3.60[9], 4.00[41,55] 3.75[38] 3.50[5]	3.50[64]	3.50[1,6,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[36]		3.50[3]		4.40[47]
Cold-rolled	4.65[5,9] 5.00[38] 5.35[53,58]	4.90[8,60]	4.90[6]	4.65[2]		4.65[7]	4.65[4,6] 5.35[12,40]		4.65[3]			4.85[3]		5.45[47] 5.80[58] 5.80[31]
Hi str. low alloy, h.r.	5.75[9]		5.50[1] 5.30[6] 5.80[6]				4.95[4], 5.50[1] 5.40[13]			5.55[36]				
Hi str. low alloy, c.r.	7.20[9]			6.70[8]			6.20[4], 6.55[13]							
TINPLATE† Cokes, 1.50-lb base box	$7.50[1]		$7.50[1]				$8.70[4]					8.80[3]		
1.25 lb, deduct 25¢	$8.70[9,15]		$8.70[6]											
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.85[1] 6.15[15]		5.85[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,33]	3.70[1,4,6,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing‡	3.70[1,5]	3.70[4]	3.70[1,6,8]	3.70[4]			3.70[1,4]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[3,4,5,62,71]	4.55[3,69,70,73,73]	4.55[74,73]	4.55[3]	4.55[4,63]									4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,33]	4.30[1,6,8]		4.30[4]		4.30[1,6]	4.30[3]	4.30[3,4]		4.30[3]			4.45[31]
Alloy, cold-drawn	5.40[17,53,69,71]	5.40[4,33,69,70,73]	5.40[4] 5.90[74]		5.40[4,63]			5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,8] 6.05[6]	5.55[4]			5.55[1]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15]	3.70[1]	3.70[1,6,8]	3.70[4] 4.00[9]			3.70[1,4] 3.95[13]		3.70[3]	4.15[36]	3.70[3]	3.70[3]		
Floor plates			4.75[8]	4.75[9]						4.75[36]				
Alloy	4.75[1] 4.85	4.75[1]	4.75[1]				5.20[13]			5.05[36]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,8]	5.65[4,8]			5.65[4] 5.70[13]			5.90[36]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,6]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,6]					5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[15]	4.85[2] 4.33		4.85[2]				Kokomo—5.80[60]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[6]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS carbon forging, net ton
	$82.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$66.00[11]	F=$85.00[19] SF, LA, S=$85.00[83]		Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[83]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4, 11]	SF=4.90[3] LA=4.90[34, 83]	Worcester=4.40[3] Minnequa=4.35[14]	WIRE RODS
		3.60[4, 11]	SF, LA=4.30[34] F=4.55[19]	Niles=5.25[54], Geneva=3.70[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[34] F=5.30[19]		Cold-rolled
		4.80[4, 11]	SF, LA=5.55[34]	Ashland=4.80[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		HI str. low alloy, h.r.
			F=7.50[19]		HI str. low alloy, c.r.
					HI str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4]	SF, LA=4.25[34, 83] F=4.75[19], S=4.50[83]	Atlanta=4.05[88] Minnequa=4.55[14]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[88]	Cold-rolled
		5.30[11]	F=6.20[19]		HI str. low alloy, h.r.
					HI str. low alloy, c.r.
					TINPLATE Cokes, 1.50-lb base box 1.25 lb. deduct 20¢
Deduct $1.55, $1.30 and 90¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4, 11]	SF, LA=4.40[34]	Atlanta=4.25[88] Minnequa=4.15[14]	BARS Carbon steel
4.30[83]	4.10[83]	3.70[4, 11]	SF, S=4.45[83] F=4.40[19] LA=4.40[83]	Atlanta=4.25[88] Minnequa=4.50[14]	Reinforcing‡
				Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4] Los Angeles=6.00[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.35[83] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester= [3] Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19]		HI str. low alloy, h.r.
	4.10[83]	3.70[4, 11]	F=4.30[19] S=4.80[83] Geneva=3.70[16]	Claymont=4.15[39] Coatesville=4.15[31] Minnequa=4.50[14]	PLATE Carbon steel
				Harrisburg=5.25[88]	Floor plates
			F=5.70[19] Geneva=5.65[16]	Coatesville=5.25[31] Claymont=4.85[39]	Alloy
		5.65[11]	F=6.25[19]		HI str. low alloy
4.25[83]	4.05[83]	3.65[4, 11]	SF=4.20[83] F=4.25[19] LA=4.25[34, 83] S=4.30[83]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		5011	F=6.10[19]		HI str. low-alloy
5.45[83]	5.25[83]	4.85[4, 11]	SF, LA=5.80[34]	Atlanta=5.10[88] Worcester=5.15[3] Minnequa=5.10[14]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

With Principal Offices

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	16.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa. 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.60	4.00	4.70					
Chicago-4				6.15				
Ensley-11	3.60	4.00						
Fairfield-11		4.00	4.40			8.60	4.50	
Gary-1	3.60	4.00					4.50	
Ind. Harbor-8	3.60		4.70	6.15	5.25	8.60	4.50	
Johnstown-3		4.00			5.60	8.60		
Joliet-1		4.00	4.70					
Kansas City-83				6.40				
Lackawanna-3	3.60	4.00	4.70			8.60	4.50	
Lebanon-3				6.15				9.00
Minnequa-14	3.60	4.50	4.70	6.15		8.60	4.50	9.00
Pittsburgh-77						9.35		9.00
Pittsburgh-78								9.00
Pittsburgh-5				6.15				
Pittsburg-24							4.65	
Seattle-62				6.10			4.35	
Steelton-3	3.60		4.70				4.50	
Struthers-6				5.60				
Torrance-24							4.65	
Youngstown-4				6.15				

Track Bolts, heat treated, to railroads, 9.85¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, c.l. lots, cut lengths 10 to 24 ft.

OD in.	gage BWG	Seamless H.R.	Seamless C.D.	Electric Weld H.R.	Electric Weld C.D.
2	13	$22.67	$26.66	$21.99	$25.86
2½	12	30.48	35.84	29.57	34.76
3	12	33.90	39.90	32.89	34.30
3½	11	42.37	49.89	41.10	48.39
4	10	52.60	61.88	51.03	60.02

Pittsburgh Steel add, H-R: 2 in., 62¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars Rosiclare, Ill. Base price, per ton net:

Effective CaF, content:	
70% or more	$41.00
60% or less	38.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	136	140	5.70	6.15
Atlanta-65	113	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85	....	....	....	....	....	....	....	....
Cleveland-86	....	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	....	140	5.70	6.15
Duluth-2	118	130	....	123	....	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	136	5.70	6.15
Houston-63	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	138	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	130	142	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	135	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	....	....
Pittsburg, Cal.-24	137	149	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53) Wheeling, W. Va., (15).

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N. Y.	104.50 to 105.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ in.		¾ in.		1 in.		1¼ in.		1½ in.		2 in.		2½-3 in.		2 in.		2½-3 in.		3½-4 in.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	21.0	31.5	22.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Toledo-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	18.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.0	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Toledo-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	73.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 20¢ to base price except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢; Memphis, add 10¢; New York, add 30¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	....	5.95	5.70	5.55	....	....	....	....	....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[16]	6.48–6.70	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	....	6.05	5.90	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	....	5.80	5.70	5.55	6.30	9.80	10.10	11.45	11.75
Cincinnati*	5.87	6.44	7.39	5.80	....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.89	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	....	5.99	6.09	5.84	6.56	10.11	10.41	11.76	12.06
Houston	7.00	8.25	....	....	....	6.85	6.50	6.65	9.35	10.35	11.25	....	12.75
Indianapolis, Del'd	6.00	6.80	8.15	5.95	....	6.20	6.10	5.95	6.80	....	....	....	....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	8.70[16]	6.40	6.35	6.35	7.55	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	....	6.33–6.38	....	6.43–6.02	6.33–6.48	6.08–6.33	7.16–7.32	....	....	....	....
Milwaukee	5.74	6.54	7.89	5.69–6.59	....	5.94	4.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.95	....	5.75	7.25	5.95	5.75	5.75	7.30	....	....	....	....
New York*	5.67–5.97	7.19[22] 7.24[1]	8.14[2]	6.29–6.89	8.63[16]	6.23–6.58	6.10	6.12	9.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[13]	....	....	....	....	6.50[13]	6.60[13]	6.55[13]	....	....	....	....	....
Philadelphia*	5.90	6.55	8.00	6.10	....	6.05	5.90	5.05	6.61	9.90	10.20	....	....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60	....	8.50	7.30	....	6.80	6.95	6.90	....	....	....	....	....
Salt Lake City	7.95	....	9.70	8.70	....	8.05	8.30	8.65	9.00	....	....	....	....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	....	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	....	6.75	6.65	6.75	9.05	....	....	....	....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[16]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES *(Standard unless otherwise keyed on prices.)*
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets; 2000 to 9999 lb. Cold-finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. Cold-rolled strip; 2000 to 9999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles; (22) 1500 to 9999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	54.00	54.50	55.00	55.50	.....
Birmingham	48.38	48.88	.....	.....	.....
Buffalo	52.00	52.50	53.00	.....	.....
Chicago	52.00	52.50	52.50	53.00	.....
Cleveland	52.00	52.50	52.50	53.00	57.00
Daingerfield, Tex.	48.00	48.50	48.50	.....	.....
Duluth	52.00	52.50	52.50	53.00	.....
Erie	52.00	52.50	52.50	53.00	.....
Everett	.....	53.25	53.75	.....	.....
Fontana	58.00	58.50	.....	.....	.....
Granite City	53.90	54.40	54.90	.....	.....
Hubbard	52.00	52.50	52.50	.....	.....
Ironton, Utah	52.00	52.50	.....	.....	.....
Pittsburgh	52.00*	.....	.....	53.00	.....
Neville Island	52.00	52.50	52.50	53.00	.....
Geneva, Utah	52.00	52.50	.....	.....	.....
Sharpsville	52.00	52.50	52.50	53.00	.....
Steelton	54.00	54.50	55.00	55.50	60.00
Swedeland	56.00	56.50	57.00	57.50	.....
Toledo	52.00	52.50	52.50	53.00	.....
Troy, N. Y.	54.00	54.50	55.00	.....	60.00
Youngstown	52.00	52.50	52.50	53.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos
Boston	Everett	$.60-.80	.....	53.85–54.05	54.55–54.75	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	68.90
Brooklyn	Bethlehem	4.29	.....	58.79	59.29	59.29	.....
Cincinnati	Birmingham	6.70	55.08	55.58	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	57.13	57.63	58.13	.....
Los Angeles	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
Los Angeles	Fontana	.....	59.70	60.20	.....	.....	.....
Mansfield	Cleveland, Toledo	3.33	55.33	55.83	55.83	56.33	60.33
Philadelphia	Bethlehem	2.39	56.39	56.89	57.39	57.89	.....
Philadelphia	Swedeland	1.44	57.44	57.94	58.44	58.94	.....
Philadelphia	Steelton	3.09	57.09	57.59	58.09	58.59	63.09
Rochester	Buffalo	2.63	54.63	55.13	55.63	.....	.....
San Francisco	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
San Francisco	Fontana	.....	59.70	60.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	59.70	60.20	.....	.....	.....
Seattle	Fontana	.....	59.70	60.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	51.65	52.15	52.65	.....	.....
Syracuse	Buffalo	3.58	55.58	56.08	56.58	.....	.....

* *Monessen, $54.00.*

Producing points prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct, $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$62.50; f.o.b. Buffalo, $63.75. Add $1.50 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $62.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $70.56. High phosphorus charcoal pig iron is not being produced.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List	
	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List			
	Less Keg (Reg.)	K.	Less Keg. (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

	Pct Off List
Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
⅝ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
⅝ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unbored

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
-	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct,		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct. Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.10
18	4	1	—	5	$1.72
18	4	2	—	—	$1.245
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	84¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	*6.75
Electrical	*7.25
Motor	*8.50
Dynamo	9.30
Transformer 72	9.85
Transformer 65	10.40
Transformer 58	11.10
Transformer 52	11.90

PRODUCING POINTS—Beech Bottom, W. Va., 15; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*, add 70¢; Indiana Harbor, Ind., 3; Mansfield, Ohio, 75; Niles, Ohio, 64, add 30¢; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $17.50
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	21.00
Detroit, f.o.b.	23.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Plainesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	21.00
St. Louis, f.o.b.	24.90
Birmingham, del'd	20.79

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	5.35¢
0.41 to 0.60 carbon	6.30¢
0.61 to 0.80 carbon	7.40¢
0.81 to 1.05 carbon	9.35¢
1.06 to 1.35 carbon	11.65¢

Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢. New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.

REFRACTORIES

Fire Clay Brick *(F.o.b. works)*

	Carloads, Per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa (except Salina, Pa., add $5)	$94.00
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.00
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.75

Chrome Brick *Per Net Ton*

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite *St. ⅝-in. grains*

Domestic, f.o.b. Baltimore, in bulk fines removed	$61.75
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢ $13.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.30
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	20.50¢ to 23.25¢

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 9-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 10% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn. penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max Si, 2% max. Fe.

Carload, packed	29.75
Ton lots	31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 19.15¢

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd., Mn. 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $89.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	$1.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	19.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.15¢
Ton lots	9.55¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.33
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.30
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	$1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$3.00-$3.05
Crucible	3.10- 3.15
High speed steel (Primos)	3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.33
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	$1.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$5.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max Si, 0.50% max. Al, 0.50% max. C, 1 in x D. Ton lots	$1.30
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	68¢
No. 79	50¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.30
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Up to '42 Mark—With the sifting down of increasing defense contracts to smaller plants and subcontractors, demand for used machines will reach high proportions this year, Cleveland used machinery dealers say. Although limited by the availability of machines, business should rival the 1942 peak, they think.

The market is expected to get brisker about Feb. 1 and dealers are trying to build up inventories in anticipation. They are not too successful.

On the Road—Dealers in their campaign to find used machines are sending men on the road with orders to find and buy almost any piece of equipment in working order. Others are paying bonuses in the form of "finders' fees" and some are cultivating relations with new machine tool salesmen for leads.

Particularly in short supply in the Cleveland district are turret lathes—and turning equipment of any kind, shears and tool room equipment. Tenor of the times is a statement from one dealer: "Anything that will work can be sold."

Rebuilding Boom—Dealers rebuilding used machines are trying to hire more men to meet schedules. They have more business than they can handle. Average rebuilding job, depending on the machine and its condition, runs about 3 months.

Starting to Move—The average large dealer is fairly well stocked with the big older machines. These items have not been too active. Now they are beginning to move slowly with faster movement predicted in the months ahead.

Private plants, where the dealer has a past relationship, continue to be the best source of used machines. Auctions are attracting plant buyers and dealers are buying for plants on commission.

Would Be Better — Used machinery business in the Chicago area would be tremendous if dealers had enough equipment to fill demand for late type equipment. Inquiries started upward again in December after a tapering off in November. Most buyers want machinery built in and after 1940. Turret lathes, screw machines, press brakes and large squaring shears are almost unobtainable.

Demand for older equipment is picking up and will continue to accelerate.

Near New Prices—Dealers are having a tough time replenishing stocks of late type equipment and prices are going up. Some auction machines bring within 5 pct of the new price and some dealers report that they are unable to buy at these high levels and still make a profit.

A few dealers, reasoning that they can get the full sale price from private sources, have discontinued the practice of giving discounts to fellow dealers.

Ear to the Ground—Dealers in the Chicago area have their ear to the ground, trying to follow the defense contract trend. A speedup was expected in January. With this the used machinery business will be stimulated.

Since it is not considered a risk for a firm to anticipate greater defense spending and consequently more war work, some companies are reportedly preparing for the near future by buying up used machinery. They will have the edge on the last-minute thinkers.

No Planned Schedules — NISA has written the National Production Authority a protest on the application of copper order M-12 to the trade. The order limits shops to the use of an amount of magnet wire (pounds) this month not greater than one-sixth of the average amount used in the first half of 1950.